UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:

IE TMI INVESTIGATION INTERVIEW

of Mr. Sydney W. Porter, Jr.
Health Physics Consultant

Trailer #203
NRC Investigation Site
TMI Nuclear Power Plant
Middletown, Pennsylvania

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NRC PERSONNEL:

Mr. Dale E. Donaldson
Mr. Thomas H. Essig
Mr. Owen C. Shackleton

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SHACKLETON: The time is 8:48 a.m. on April 24, 1979. This is an interview of Mr. Sydney W. Porter, Jr. This interview is being conducted in Trailer #203, just outside the south gate of the Three Mile Island Nuclear Power Plant. Present to conduct this interview from the U.S. Nuclear Regulatory Commission is Mr. Dale E. Donaldson. Mr. Donaldson is a Radiation Specialist in Region I. Also present is Mr. Thomas H. Essig. Mr. Essig is Chief, Environmental and Special Projects Section, Region III. In addition, Mr. William H. Behrle, Project Engineer for the Metropolitan Edison Company is present at the request of Mr. Porter. Prior to the beginning of this interview the moderator, my name is Owen C. Shackleton, presented to Mr. Porter a two-page document from the U.S. Nuclear Regulatory Commission which explains the purpose and scope of this investigation and the authority by which the U.S. Nuclear Regulatory Commission is conducting this investigation and the rights that Mr. Porter has to refuse to be interviewed or to submit a signed a statement. On the second page at the end of this document were three questions to which Mr. Porter responded to all three affirmatively. These questions I will read now, and if you would, Mr. Porter, please respond so that we will have the record on tape. Did you understand fully the text of the two pages of information?

PORTER: Yes.

SHACKLETON: And do we have your permission to tape the interview?

PORTER: Yes.

SHACKLETON: And would you like a copy or a transcript of this interview?

PORTER: Transcript, yes.

SHACKLETON: Al right. That will be provided. And now, Mr. Porter, for all the persons who will be listening to this tape, would you please give your background and experience in the nuclear industry.

PORTER: Well, yes, my background is that I started as a radiochemist about 25 years ago in the nuclear industry and worked at Martin Nuclear Company as a radiochemist, then went to Electric Volt Company for the, Oh, I guess nautilus through the fleet Ballistic Missiles submarines as health physicist. That's where I got my practical training. And went to the Armed Forces Radiobiology Research Institute where I ran the radiological safety department there for the first seven years of its existence. I became certified by the American Board of Health Physics, and essentially had twenty some years experience in practical health physics and also in, I guess, the research and development aspects of health physics also as pertains to power reactors, to research reactors, and to accelerators. At that point, after the Armed Forces Radiobiology Research Institute, I became vice president of a company called Radiation Management Corporation, where we specialized in the writing and the implementation of medical emergency plans and

also general emergency plans for power reactors. I was there for the first six years of RMC's existence, and about five years ago I formed my own consulting company known as Porterguard's Consultants. My main clients there, I say about 90% of our business, are utilities -- nuclear utilities -- and we are the consultants to Metropolitan Edison in general health physics practices and environmental monitoring in the design and implementation of the plans, the reduction and interpretation of data. We are also their consultants in emergency planning and write the scenarios and help train people for the implementation of the emergency plans and emergency procedures. Hopefully this is enough.

SHACKLETON: Yes, that's fine. Thank you very much. Now, gentlemen, I'll turn the interview over to you for questioning.

DONALDSON: We're going to mention our names before we go on so the girl will know we're not just screaming our own names for... You have a similar involvement with some other nuclear facilities, I believe, do you not, in the area of emergency planning and general health physics?

PORTER: Yes, I do.

DONALDSON: What are some of these other facilities?

PORTER: Well, Salem Units 1 and 2. We've done some of the paperwork for Hope Creek 1 and 2. I earlier on had involvements with all the PJM reactors, as a matter of fact, at one time or another. When I was with Radiation Management Corporation we did Peach Bottom 1 and 2, a little bit on Limerick, which is all paperwork, of course. Let me think, now, what else? Susquehanna 1 and 2... I don't know how much history you want. I can go on and talk about plant after plant. Right now, presently, I'm involved with Con Ed for Indian Point Unit 2, PASNY for Indian Point Unit 3, Salem and Hope Creek as I talked about before and, let me see now, there are also certain hospitals that are near some nuclear facilities, not all power plants, that also have asked for some consulting in the way of what can a the hospital do without having to build a new wing in order to be prepared for contaminated patients or patients that come from the nuclear industry.

DONALDSON: Is your involvement with the other nuclear power plants similar to that here at Metropolitan Edison, that is, general health physics practices, emergency planning, and environmental?

PORTER: Yes.

DONALDSON: I wonder if you--

PORTER: That's my whole group, now, just not me personally.

DONALDSON: I understand. I wonder if you, as far as your involvement has been with the other facilities, other nuclear power plants, could give sort of an objective view of the TMI emergency response program in comparison with other nuclear facilities of which you have knowledge.

PORTER: Alright, that's a good question. I think that in the response of the utility itself, I think which is very important, I found that Three Mile Island has been extremely...let me look for the right word now, because I am tired... Three Mile Island has always put forth a very large effort in the emergency planning area. They have run more drills to a greater degree than many of the other utilities and they've been... I'm trying to think... extremely good about trying to adjudicate the millions of the small problem areas that creep up with the drills, trying to say 'Hey, alright, this is the problem, now let's go solve it'. They, as you know, have a very strong leader in Jack Herbein. He's always insisted that (a) the drills be run properly, (b) that there be plenty of practice exercises, and (c) that it worked, that it be put together and it worked. And that's a lot of, that is a great deal of effort that has to be expended to do this. And I think you'll agree, you've been in many of them yourself, that they have really put forth a great deal of effort in the emergency planning area.

DONALDSON: In relationship to your involvement with TMI, what specifically has been your input or involvement in the emergency planning program at the facility?

PORTER: Well, in the early days before the plant was built I helped to write the words in the Final Safety Analysis Report that were in the emergency planning section. Then after the...and then when the plant started to go on line, Unit 1 for the first time, I helped write scenarios and to give practice and training to the plant staff in emergency planning. As you know the implementing procedures are never finished, they are an ongoing project, so to speak, and as the plant changes, one has to change the emergency implementing procedures. And so I've always given input into these emergency procedures, where I've seen places where I thought they need to be beefed up, we've worked on that. And I've also worked with the State and the local county in the interfacing of emergency plans and implementing procedures, and each year I've come back to write practice scenarios for a series of practice drills and then the actual scenario for the drill that's audited by the NRC.

DONALDSON: Now, that sounded like a pretty heavy involvement. As a consultant, would you say that in terms of the development of the emergency plan and the response program, the configuration of equipment in kits, the writing of emergency procedures, the training, that in the whole sphere of emergency planning that you were instrumental in 50%, 75% of the activity? Just how much of it was given to you to carry out and implement in your consultant capacity?

PORTER: I'm going to have to ask you a question in order to answer your question. Now, I'm only one person. I only spend part of my time doing this, and there are many people that...I've made work for a lot of people. I don't know what... you asked for percentage and then you say instrumental, and therefore it's very hard for me to answer your question. I had something to do with reviewing what people were doing and I had something to do with saying 'Hey, this looks right/this doesn't look right', kind of thing. But I did not actually sit down and write each implementing procedure. I would look at them and say, 'Alright, here's a portion of one I think I ought to maybe rewrite', etc. I don't believe that a consultant can write actual operating procedures for a utility, or for any other large, complex organization. I think all I can do is say, 'Here's the need', you know and maybe 'Here's an outline of what the procedure ought to look like, but you all will have to make it work for you'. And then they did most of the work. So I would say that I did 5% maybe, as far as the total work. It's a huge amount of work that goes into an emergency plan, and I don't think a consultant should write all these procedures for a utility at all. All I do is say 'This one, I don't think this one, from my experience this one isn't going to work and here's why, let's look at it again.' Then if they didn't agree with me, then we'd run a drill and we'd see whether it would work or not. And then we would go back and modify it. But this is a small percentage of the total effort involved for the utility. I'd say maybe far less than 5%. You realize I'm only guessing on this percentage. As far as...are you

talking about total man hours? I'm not quite sure of what your, what the thrust of your question was, now that I think about it.

DONALDSON: Of the final document that is represented by the two volume set of procedures in the emergency plan...what I'm trying to do is establish whether the majority of the work originated on the Island and was reviewed by you or it was a combination of your originating the work and the licensee reviewing it. I think you've answered the question, really.

PORTER: Maybe it's the former. In other words, the great majority of the work was done by the utility and I would look at and say 'From my experience I don't think this is going to work'. Or I'd say 'Hey, maybe here's another procedure that we ought to have in here that's not in here' kind of thing. But I do not believe that consultants should write entire operating procedures for a utility, as I said to begin with.

DONALDSON: Final question in the area of the preplanning aspect. In terms of coordination with State and local officials, you mentioned that you pursue interfaces with these agencies. Were you accompanied or did this occur in joint meetings between the licensee and these other agencies and yourself, or how were these normally pursued?

PORTER: Oh, no. Just at every face to face meeting that I can think of, there were always utility people with me. I've strived to do that. Now there would be phone calls, of course, where the utility wouldn't be with me where I'm trying to get some technical point cleared up. But I always had somebody with me from Metropolitan Edison. I can't think of any exceptions to that. There might be one or two exceptions over a 6-year period but again it was the utility that had to carry out the emergency plan, not me. Therefore, it was important that they pursue the interfaces.

DONALDSON: Tom, did you have any questions in this area before we move on?

ESSIG: I don't think, not in this. I think we'll probably be getting to one of the -- this is Tom Essig speaking by the way -- one of the specifics... Dale, as long as you opened the door on one question, I guess specifically Syd, did you have any... let me rephrase that. What specific involvement did you, say, have in the offsite dose assessment procedures that are in the emergency plan? Did you play a heavier role on those procedures versus the... versus some of the other implementing procedures, or would you say that your role in all the implementing procedures was about, you made a similar effort in each one?

PORTER: I'd have to say it's close to similar. That's not completely true but the thing is that I can't take any group of procedures and say I spent more time on those than others.

ESSIG: Okay.

DONALDSON: Alright, let's move on to the events in the period of interest. And our period of interest is, of course, 0400 on 3/28 through midnight on 3/30. I wonder if you'd just go through that period of time and explain your involvement and your role in the TMI-2 incident during that period and where possible provide us with times and with who's and what's and so on.

PORTER: This is through midnight on the 30th, did you say?

DONALDSON: Through midnight on the 30th, correct.

PORTER: Alright. I got a call about 8:00 in the morning from a Metropolitan Edison rep...from Michael Buring, who's the staff health physicist at Met Ed. He briefly explained that a very serious incident had occurred, that there were some releases that were going on and said that he wanted me to put the wheels in motion and be ready to go into the expanded offsite environmental monitoring program, what we call the REMP, the radiological environmental monitoring program. He said 'don't do anything yet', but he said 'I want, you know, the

sample collectors ready, I want everyone to understand what the regimes are, the sampling regimes are', and he said since we're the ones that designed the program, you know, I just briefly said 'okay, we'll do it 1, 2, 3, 4, and 5', which had already been set out ahead of time as to how we would expand this. And he said, fine, he said 'don't do anything just have it ready'. So I talked to Steve Gertz, Dr. Gertz is the one that actually does most of the following of the radiological monitoring program, and we sat down and spent about an hour just thinking, 'okay, now what order do we want to pick up samples in', etc. just to make sure that we had everything together. And we go ahold of Ron Laughlan, who's professor of terrestrial ecology at Elizabethtown State College here, and put him on standby to start picking up the samples because he's actually in charge of the sample collection program.

DONALDSON: Excuse me. Could you give that name again?

PORTER: Ronald Laughlan, I believe it is.

DONALDSON: Sid, could you expand a little bit and tell us what this increased environmental sampling program entailed? And I believe you gave an acronym.

PORTER: REMP.



DONALDSON: Could you...

PORTER: Radiological Environmental Monitoring Program, which is the acronym that we use for the program. And essentially the program is one where we change TLD's either monthly or quarterly, where we take maybe one milk sample, I don't mean one, maybe four to six milk samples monthly during the grazing season only. Where we, you know, take water samples, composite them, the downstream water -- close in downstream water user--we composite to, I believe, a monthly sample. It might be weekly, though. I'm going to have to be check on-- I don't have all this memorized, see this is Steve's area, not mine, as far as precisely what we do. But the point is that instead of doing all things on a weekly or monthly basis, we move them back and we do them on a day or every two or every three days depending upon what the item is, basis. And that's what the expansion consists of. It had been thought out ahead of time as to what we would do. But again, no matter how well it's thought about, thought out ahead of time, in order to get maximum information from things like TLD's you need a rough idea of what the exposure is going to be, and what the situation is, so that you can have optimum changeover times. And you have to think about this carefully. And especially since I thought about the fact that the TLD's are one of the things that we can use in order to come back to the radiogas source terms. And therefore it was very important that we had the given sequence of how they were going to be changed. And we thought about, you know, technical problems. We wanted to make sure that we were well covered on exposure during changeover times, intransit exposure is what we call it. These are

all the things that one has to-- even so they've been thought out ahead of time, you have to rethink just before you do it, in order that you get the optimization of your data and that you don't lose data. And so these are the things that we were thinking about. Now, can you repeat your question again, I don't think I've answered the whole question.

DONALDSON: Well, I think you have. All I wanted to do was just have a general description of what the REMP involved.

PORTER: I can tell you what it's progressed to now. We are now, and actually we started this on about the second or third day. We are now doing daily samples of drinking water, four downstream and one upstream location. We're doing daily, surface water, one upstream and one downstream location. We're daily doing, taking milk samples of five local dairy farms. Every three days right now we're doing 20 TLD locations.

DONALDSON: Syd, let me interrupt you just for a second. What...could you repeat the day when this... when did this expanded program go into effect? And secondly, you spoke of this program as if it were a preplanned program that would be implemented at, be triggered by an event such as this and you would more or less automatically go into effect for either Three Mile Island or any other--

PORTER: This is a theory, this..this...the environmental report has the theory in it, where we talked about a base program, so to speak, and then an expanded program. And the amount that it's expanded has to follow whatever the incident is. For instance, a year and a half ago we had far higher iodines than we have now in the milk. And therefore, we followed the milk and we followed the iodine in air samples very carefully.

DONALDSON: These were higher iodines from plant releases, from--fallout or...?

PORTER: No, I'm sorry, this is from the Chinese weapon testing the incident that we had... you know, it might have been a year and three quarters ago. I can't remember exactly how long ago but you all must remember--

DONALDSON: I wanted to make the record clear on that.

PORTER: --that incident, and so at that point we took a few waters but our experience was that you don't see much in water. You know, we did monitor the water but we didn't monitor the water every day. But we did the milks every day because we knew that's darn well that's where we're going to see it. And we upped everything a little bit but then we really zeroed in on the indicators where it was obvious that if we were going to see results, that's where we would see them.

Because there is enough experience in environmental monitoring to be able to say 'If this is the nuclide, and this is roughly the chemical form, this is where we ought to see it, in the environment'. And so we up everything a little bit and then we hone in on what we're specifically looking for. And so we were doing many, many milks daily and we're doing them way far out, too, because we knew that there is not just the close in involvement for Chinese weapons testing, but a very large involvement, you know, throughout the whole eastern seaboard. So I think one does tailor, even so we have a prescribed regime for increasing, you have to think about what you're doing a little bit and you have to say 'This is where my efforts are most likely to yield some results'. Because you just can't sample the world forever, you know?

DONALDSON: Right. Sid, about how large a staff does it take to fully implement this program -- or did it take under the scenario that you did implement?

PORTER: Alright, now you're asking me another question. I haven't answered your earlier one, so which one... I just got the answer to your earlier question. Which one do you want to go? Staff size or program?

DONALDSON: Well, I think you did really finish the program in terms of all we needed to know. We wanted really a general picture, the

details of exactly how many samples and so on and so forth at this point. We just wanted to get a feel to make the record clear.

PORTER: Well, what I wanted to tell you was that, you know, we set up on the 28th to perform the program. We took no samples on the 28th. We started on the 29th to actually take samples with the increased regime.

DONALDSON: Okay now, how many, how large a staff does it take to implement this program?

PORTER: Okay. Let's start at the beginning. It takes somebody to do the thinking and the coordinating, to pick up the samples to make sure they get to the proper laboratories, to let the laboratories know that increased number of samples are coming and to give the laboratories some priorities, which samples should be done first, second, third, to talk about whether or not any samples need preservers in them, things like that. And so it probably takes, the first couple of days it takes at least one man 50% of his time in order just to get the wheels rolling into an increased regime. Just the man that is the planner, the thinker and the overall coordinator, at least 50% of his time. The other 50% of his time in an incident like this, the other 150% of his time is spent in answering questions. (LAUGHTER) From everybody, because everybody is concerned. The utility is concerned, the laboratories are concerned, everybody involved, and then of course the NRC

is concerned and so they're calling in to him. Everybody knows who he is and he does his best to answer their questions. I'd say that if nobody talked to him it would take 50% of his time just to do the planning. Now that's the first guy. The man taking the samples, probably it takes him... his sample run is 4 to 6 hours for each run that he makes, just to pick up the samples. Then they have to be delivered, and a sample is delivered to two laboratories. And so you have sample runners and the sample runners probably take maybe three hours each way to deliver the samples and then to come back again. The samples have to be delivered to the two laboratories involved. Then the work starts for the laboratories, and the laboratories were asked to work around the clock and are still working around the clock. And the two laboratories, Teledyne Isotopes in Westwood, New Jersey and Radiation Management Corporation in Philadelphia. And they work around the clock and it's just a matter of seeing that they're coordinated, that they're ready for the samples, there's somebody there to receive them because they're coming at all times of day and night once you start a large regime like this. So, and then after all this happens it takes maybe a quarter of a man day or less, it takes one to two hours to review the results of each day's data and to say 'This is reasonable, I don't believe this, redo that sample'. Well, we take at least twice the sample that we need so that the laboratory always has the prerogative of redoing the sample and it takes at least one to two hours to review the data, to put it in the format so that it can be discussed with the utility. Does this answer your question? In other

words, there are a number of people that are doing this along the way. It's not a one-man effort at all.

DONALDSON: I understand. Totally, could you just give me a number before we--

PORTER: You'll have to add up what I just told you.

DONALDSON: You don't know how many people it takes?

PORTER: Well, I just told you how many people it took very specifically.

SHACKLETON: Gentlemen, we'll end our discussion just for a minute while we change the tape. The time is now 9:22 a.m., April 24, 1979.

SHACKLETON: This is a continuation of the interview of Mr. Sydney W. Porter. The time is now 9:27 a.m., April 24, 1979. Please resume the discussion.

DONALDSON: Syd, let me rephrase the question. In the site related activities, that is the collection of the samples, the delivery of the samples to the laboratories and coordinating of the various aspects, how many people did it take at the site to coordinate this increased sampling program?

PORTER: Okay. Well, of course that's not the whole story, but it took one person at my office essentially full time for coordination and data interpretation. In other words, it took an eight-hour day for the coordinator; it took for the sample pickup, it took from one to four people, depending upon which samples we were picking up at the time in order to get them in a timely manner. One man actually could have done it but he would have been working 10 to 12 hours a day. I prefer to use several people and pick the samples up more quickly and get them out to the labs. Plus the fact that it took two or three runners to do this, and so we have 1... 2... 3... 4... 5 people, a minimum of 5 people involved in this, plus all the people in the laboratories around the clock to analyze these. Plus the time of Metropolitan Edison for dissemination of information which took at least a half a man day just get the data out to the parties that needed to have the information. So this gives you, I think, a feel for the level of effort involved. And these are all people, by the way, that are trained, that have done this, you know, for years on end, know what precisely what they're doing and how to do it. If there were new people, of course, it would take considerably more effort involved. Does this answer your question, Dale?

DONALDONS: Yes.

ESSIG: Syd, you mentioned the one to four people involved and you initially told us that Mr. Ronald Laughlan was the primary sample

collector and the other four you indicated were trained. Are these people... what... who are they ordinarily employed by? Were they Met Ed employees, or--

PORTER: No, these are. This is... one of the reasons for this is that this load would not be on Met Ed, that the load would be done by an outside independent organization as far as taking of the samples. The act of taking the samples is very important. If that isn't done, then the whole rest of it goes to pot in a hurry. You have to take the samples accurately and properly. That's why we got this department head and trained him five or six years ago, I guess...

ESSIG: This depart-- Mr. Laughlan?

PORTER: Mr. Laughlan. We trained him on... he's a fine terrestrial ecologist, a fine scientist. And we trained him to take them, take the samples. He understands because of the nature of his work the in college, there, how important sample taking is, and he has graduate students that he's trained to go along and help him and then deliver these samples. And he has, you know, he has two graduate students that are used full time and he uses a number of people just for runners, just simply transporting the samples, to where they need them, to the two laboratories where they get them. Of course, the reason for the two laboratories is that one acts as a quality control on the other. And therefore, we feel that we have better data results when we have two laboratories. Many of the samples are split.

ESSIG: And Syd could you state for the record which laboratory was the primary laboratory and the other...which one is acting as the the quality control.

PORTER: Teledyne Isotopes is the... well, okay. For the majority of the program Teledyne Isotopes is the major laboratory and Radiation Management Corporation is the quality control right now. However, when we have large volumes of samples sometimes we have to resplit them again, depending upon, you know, how fast they can make it through the labs. They're both fine laboratories, and either one is capable of being the primary laboratory.

ESSIG: Syd, let me just come back to one point that you were making earlier with regard to the radiological environmental monitoring program. I believe I'll just sort of summarize what you said. You indicated that there were a number of routine sample locations which are,....where samples are collected on a monthly, quarterly--

PORTER: Sometimes weekly, depending on what it is, basis.

ESSIG: Basis, right. And then you indicated that there was an augmented program or a, I don't recall the exact word that you used--

PORTER: Increased sampling regime--

ESSIG: --expanded program--

PORTER: Expanded program, yeah..

ESSIG: I just wanted to, the point I wanted to make or the question I wanted to ask was, you've made reference to this expanded program or at least the bases for an expanded program being discussed in, was the Annual Environmental Operating Report, or...

PORTER: Now we actually, this is really discussed in the FSAR a little bit. We talked about, alright this is our base program. I should say the environmental report, which is part of the FSAR.

ESSIG: Okay. You did say environmental report then, yes.

PORTER: We have a base program and then we have a bases from the basic program to expand this. It is important, I think, an important lesson, and that is that one needs to think ahead of time. If you're going to expand the program, where and how do you want to expand it? And what does it take to expand it? And one of the, I think, lessons learned here was that if we had had the to rely on plant people those first two days to expand the program, it was very hard for us to expand it, because they were so busy taking care of the incident. And so I think that's a lesson well learned here, that we had an outside independent organization that could just go gangbusters on this thing

and they were ready a hour after we called then on the 28th to go take samples. We had to hold them back, to say 'No, let's wait awhile. Let's look at what we're going to do and make sure that we have our timing down right'.

ESSIG: Okay now, 'they' being Laughlan and...

PORTER: Yes, Laughlan and his people. And also Steve Gertz and... everybody was ready, in other words the preplanning worked out quite well. I think everybody, from what I can see, responded quite well on this. All the way through the laboratories.

DONALDSON: Could I tie up just a couple of times a little bit? Between 8:00 in the morning and 9:00 in the morning on the 28th is when Mike Buring first notified you and told you to put the program in place and get geared up to go if the order were given.

PORTER: Right.

DONALDSON: What time did, by what time would you say then that the program would have been ready to be implemented if needed?

PORTER: Well, if he had told us to go right away, probably within two hours we could have had somebody out there working on it.

DONALDSON: The way the normal course of events unfolded, though, by what time had you alerted everyone--

PORTER: You're going to have to ask Steve Gertz that because I went on, I started thinking about other things. You see, remember he's the guy that normally implements this program. And I just simply said 'Well, when you have a chance this morning, looks like they're in no hurry to do this but you better call Ron Laughlan', and then he came back some time later to me and said 'I've notified Ron and we're ready to go'. And I said 'Well, you know, Met Ed in Reading said stand by, and so just stay standing by and give them a call every three or four hours if you don't hear from them to let them know that you still have everybody standing by'. I had some other fairly pressing business and so at about 11:30 in the morning-- they had asked me personally to stand by, to come down to the plant for other health physics related work that they wanted me do within the plant. And then, at that point they said 'Well, we're not quite sure whether we need more people right this moment, so stand by'. And I had five people that had just flown down from Connecticut to Salem. And so I called and said Salem's one more hour away than I am now, is it alright for me to go down to Salem and meet these five people that have been there all morning to see me? And they called with a number of small questions during the morning but, you know, I don't remember offhand what they were now. But they were things that they just needed quick answers to and I gave them. But it was obvious that they didn't feel that at that point

they needed me, so I asked to go to Salem where I had these five people waiting for me. And they said 'Sure, go ahead'. And I told them it was only another hour away.

DONALDSON: Then when did you receive a call requesting you to come to the site?

PORTER: Murphys Law! When I was on my way to Salem the site decided they needed me here. But, of course, that was... I stopped for lunch and went on down to Salem because I had the feeling...you know that...they said 'We're going to need you probably, but just be available to us'. And when I got down to Salem in the early afternoon there were half a dozen messages for me. And Murphy's Law again, as I drove into Salem the two helicopters went off, the two public service helicopters went off. And so I wasn't able to helicopter because at that point they said 'I think you really ought to be up here just helping us' in the Unit 1 control room.

DONALDSON: And who made that request, who were the messages from that wanted you here in the unit, in the control room?

PORTER: Jim Seelinger specifically called and asked me to come up. And he asked me to come up right away.

DONALDSON: Alright. About what time did you arrive on site?

PORTER: Well, let's say at the observation center. It was about 7:00 pm because what I did after I talked to Jim briefly was, it was obvious that there were a lot people that had been out there monitoring the environment for some time in the on and offsite monitoring teams and there were a couple of things that came through to me right away. I remembered, 'Hey, these guys are just through with a five or six week outage. And so they all are a little tired to begin with.' I mean, these are thoughts that went through my mind at the time. 'And they're going to need reliefs for these people. And I want to get experienced people to relieve them.' And so I went to, I took about an hour's time, instead of coming right away I took an hour's time and I went to see the superintendent of Salem plant and I asked him for the supervisor of health physics and chemistry, and four of his best health physics foremen.

DONALDSON: Let me--

PORTER: You know, all experienced people and his emergency van. And, you know, assuring him that, you know, 50% of the emergency equipment would be left there, we wouldn't deplete them. But it just occurred to me that they had needed some relief up here so I had better make some provision while I was down there. And it turns out they needed respirators... Well, that's one of the first things I did when I got

there, is to... there was a call for respirators had already arrived and so I made provisions for getting 150 respirators and 500 cartridges sent up by truck right away. I did that and I thought about the people and then talked to... finally got ahold of Seelinger and talked to him and at that point saw that we needed people and to me it was more important to get good experienced people with their own instrumentation so they didn't rely on anything, didn't really need to have anything in plant, than it was just to send a lot of bodies up there. And so that's why I insisted on quality rather than quantity at that point, so I'd have survey teams that could go out and just start to work with a minimum of instructions.

DONALDSON: Now, you began these efforts at the observation center, is that correct?

PORTER: No. This effort that I'm talking about I did right there at Salem. In other words I went into the superintendent right there, while I was at Salem. I thought I'd better use... while I'm here I'd better talk to the right people and make sure I get just what I need. And so I walked in and talked to the superintendent and said this is what I need.

DONALDSON: Did you have any discussions with Dick Dubiel, or were your discussions solely with Mr. Seelinger?

PORTER: Solely with Seelinger. It was hard to get in touch with Seelinger, and it was solely with Seelinger. But, of course Seelinger is Dubiel's boss so, you know, in the operating organization, because he was the Unit 2 superintendent, I believe. So, he was the person that I talked to.

DONALDSON: In other words, you did--

PORTER: ...Unit 1 Superintendent.

DONALDSON: You did not discuss with anyone in the health physics or radiation protection group any of the needs that may have existed or any needs that they may have had at the time? You sort of operated on the call of Mr. Seelinger and began mustering forces?

PORTER: Right. Well, I had, you know, asked him what was needed, he told me what was needed. He said that Dubiel was very busy right now taking care of plant matters, and so I did what I could. I just took an hour out in order to try to think things through a little bit and make sure that I would come up with something that would be of real help. I also called the State of New Jersey because they have two SAM 2's and asked them to deliver one of those SAM 2's up here, so that we would have not only the Sam 2 that came up with the Salem van but also one of the two that were across the river from the Salem plant. So I took two of Salem's four SAM 2's, is essentially what I did up here

for monitoring. And they later on turned out to be very useful. More useful, as a matter fact, in the control rooms for getting people off the respirators than they were out in the field. I can talk about that type of problem later if you want to.

DONALDSON: Okay, we're back now at 7:00 p.m. at the observation center. Who did you have discussions with, who did you meet at that point and...

PORTER: I met Dave Limroth who is Dubiel's boss. And I sat down and talked with him about what was needed and then I talked very briefly with Jack Herbine and he gave me my general orders. And my general orders were that he wanted me to help out where I could in the Unit 1 control room which was running the on and offsite monitoring teams, he wanted me to start to establish an effort to assess the radioeffluent releases, both gases and liquids, and he said 'Do what you can to fill in for Dubiel who's 100% of his time is now with the Unit 2 plant.

DONALDSON: Okay, with those general marching orders, did you then proceed into the plant?

PORTER: Yes, I did. I got Dave Limroth to give me a pass to get through the north gate which I knew was important, to be able to get, to have access on and off easily. Because, as you know, the observation center was actually a very good station point because it was offsite,

and yet it was close enough and the communications were fairly good. So that, I felt that I needed to get back to interact with management and yet be in the middle of things. So I did go in to Unit 1 and, I essentially,--they have a radio, you know, full time radio link between Unit 1 and the observation center at the point. And once I got into Unit 1 I essentially stayed there for about two days.

DONALDSON: About what time did you first arrive in the Unit 1 control room?

PORTER: Roughly 8:00 in the evening. That's very rough, Dale...

DONALDSON: I understand. Just an approximation is fine. Alright, at the time you arrived in the Unit 1 control room--

PORTER: No, wait. What I did before I went there was to make sure that the Salem people would be given passes and would be sent right up after me to the Unit 1 control room so they could relieve these other teams, because I knew these other teams had to be very tired. And so I wanted to make sure, I also made some calls over there to make sure the people were coming down from Susquehanna because I knew Denny Traut, who was a HP foreman here at TMI would be of invaluable help. And I wanted to make sure that he and some trained people, he and his boss Bill Allen, I wanted to make sure they came down. So I made those arrangements right away also while I was there during that

roughly the hour over there at the observation center. I just wanted to make sure that we were getting the replacements in that we were going to need and I wanted first class replacements to relieve these teams.

DONALDSON: Okay. Upon your arrival in the Unit 1 control room, would you just basically describe who was in charge, what activities were in progress and your general impressions of the activities being conducted?

PORTER: Alright. Let me start with the activities. The reason is that I don't...the people were...the emergency duty officer there were on 12 and off 12. And it kind of blends into my mind as to who was on and who was off at the time.

DONALDSON: Excuse, you said 'emergency duty officer'. Do you mean emergency director?

PORTER: Yeah. The emergency director there. I went to the emergency director immediately, told him I was here, I was at his disposal. To help him wherever I could. And what did he need help with. I also told him about the reinforcements that I had arranged for and that the Salem team was less than a half hour behind me and, you know, he said 'Good, we need to relieve these people', etc. And he asked me to review what was going on with the teams to make sure that the data formats were proper, things like that. And to follow the on and

offsite environmental monitoring for a while and then report back to him.

DONALDSON: The emergency director at this time was... do you remember?

PORTER: No, I don't remember who it was at that point. There were a number of people, you know, that were emergency directors in that first week and we're now, what, four weeks past the point? And I think I have it on tape but I don't remember who it was at that point, who the emergency director was.

DONALDSON: Alright, so upon receiving again some instruction as to what you could do to help, who in the licensee's organization was presently or already engaged in those kind of activities located in the Unit 1 control room?

PORTER: That would be, according to the emergency organization, the radiation protection supervisor or his alternate. Len Landry was one of them, who is the, he's a health physicist and a nuclear engineer and he works in the nuclear engineering position within the health physics organization. And Len is also their specialist in dose assessment.

DONALDSON: Was Mr. Mulleavy in the Unit 1 control room at this time?

PORTER: No, Messrs. Dubiel and Mulleavy were, I believe, relieving each other in Unit 2. I believe, I'm fairly sure that's what's was happening in Unit 2 at the time I arrived. One of them was on and the other was off to replace the other one... You know, in other words they were working 12 to 12's. And I, see, there's a hot line between Unit 1 and Unit 2. So anytime I wanted to talk to them I just simply picked up the hot line and talked to them. Of course, one of the first things I did when I went in was to say 'Hey, I'm here and I'll try to take care of things over here as best I can to help out. Let me know what your needs are'. And I was just told 'Hey, we're very busy here, and we'll get in touch with you when we need something from you. Take a look, you know, just try to follow the general health physics program'.

DONALDSON: Len Landry, as far as you can tell, though, was the one who was directing the offsite monitoring teams at that time?

PORTER: Right. And he was spelled by other people, but as I remember it was Len Landry that was doing that. He's very capable of this, he's had plenty of experience...

DONALDSON: Okay, the position or the individuals who were coordinating the offsite surveys. I noticed that you talked to the emergency director and you called Mr. Dubiel and Mr. Mulleavy and let them know that you were there. You were given several tasks. One was to...Jack

Herbein had given you some initial tasks to assess releases both liquid and gas; you reported to the Unit 1 control room, the emergency director asked you to help out with the teams; you called Mr. Mulleavy and Mr. Dubiel and they again asked you to follow general health physics practices and help out where you could. Now, what I want to try to do is break this down a little bit. In the Unit 1 control room, under whose or to which licensee person in the emergency organization, under whose direction or control were you operating?

PORTER: Well, whoever was the, you know, the director there in the Unit 1 control room, in other words, he's the guy that I operated under because he's the one that was giving the orders.

DONALDSON: Alright. Now let me expand this a little further. Mr. Landry was controlling the offsite survey teams. And Mr. Dubiel and Mr. Mulleavy were alternating in controlling inplant HP. And the chemistry supervisor, whom I don't recall offhand and the foreman for radwaste were involved in liquid and gaseous releases. Within each of these areas as you became involved, did you coordinate your activities with the corresponding licensee individuals responsible for those areas? Or did you sort of proceed independently and coordinate only with the emergency director?

PORTER: Well, as best I could. It was hard to get ahold of the people I wanted to. In other words, I talked to Kerry Harner who was told that he was sort of the acting chemist involved and I told Kerry

I was here and I told him what some of the things that needed to be set up to do in order to get samples. I talked to...see Limroth is in charge of all the people that you talked about just about. Most of them...

DONALDSON: Okay, let me interrupt for one second--

PORTER: I would go back to Limroth and say 'This is what I'm doing now'--

DONALDSON: We're talking right now about the approved emergency plan and the emergency organization and the approved reviewed procedures and that particular position, Mr. Limroth is not in that organization. The organizational line would be Mr. Dubiel, then at the emergency control center the assessment group. Next in line would be the radiation protection supervisor whose prime functions are to control every team: in plant health physics, onsite monitoring, offsite monitoring, wash down area monitors, so on and so forth. What I'm trying to establish is at the time you arrived in the Unit 1 control room, was it clear that the emergency organization was staffed in such a manner that you could readily determine who was in charge within the emergency organization? To know who you should coordinate with, for various requests.

PORTER: Well, it was clear that, you know, that Dubiel and Mulleavy were over in Unit 2 and they were taking care of the incident in Unit

2. Okay, so that was clear. It was clear who the emergency director was in Unit 1. It was clear who was coordinating the teams and doing the dose assessment. Those things were all quite clear, even when I arrived.

ESSIG: The... just clarify one point, Syd. It was clear who was coordinating the teams and doing dose assessment, that was Len Landry?

PORTER: It is different people. In other words what I'm saying is that I can't remember, I cannot remember when I first went on who it was. Landry was the...how can I say...was the major person who was doing it and setting protocol. And he would be relieved by someone else and they would be following that protocol.

ESSIG: Okay, let me come back to one point. I think it ties in a little bit with the line of questioning that Dale was pursuing--

PORTER: There were other nuclear engineers, Howard Crawford, that were there, etc.--

ESSIG: Yes. Yes.

PORTER: And they were doing that job.--

DONALDSON: We want to think now, in the lines of...we'll get back to your question in a minute Tom...We want to think in lines of the emergency organization now. We're trying to get a handle on whether or not the organization that was outlined in the plan existed; if it didn't why it didn't, if it did, was it effective? And then how you interfaced with this organization. Tom, why don't you pick up on it?

ESSIG: Yes, and I guess along that same line, when you...met Limroth and Herbein, and I believe you used the words that Herbein had indicated to you that he wanted you to get involved with the running of the on and offsite monitoring teams--

PORTER: He just said look at it, is what he said.

ESSIG: Okay. And then fill in for Dubiel and Mulleavy?

PORTER: You, well--

ESSIG: I guess what I'm trying to get to, Syd, is as a consultant, I'm just wondering what authority, responsibility -- I guess authority's a better word -- were you given? Were you told to actually go in and if either Dubiel or Mulleavy needed relief to actually then essentially step in their shoes and start--

PORTER: Not in Unit 2, no.

ESSIG: Okay. Or with respect to the direction of the onsite and offsite monitoring teams, were you given any charge to relieve the individual that was doing it or was your role more of an oversight one?

PORTER: No, more of an oversight role. I was not asked to get on the phone and to direct or get on the horn radio and direct the teams. What I was doing was looking at, okay, what data are we getting in? Are we using the teams in the best way we can use them? Are we getting enough of the right kinds of samples? Look at technical problems involved. I was not, I do know the people in the plant and when I did ask them to do things they were very cooperative. I never had any problem with authority, if that's what you're thinking about. Just because...you know, I've worked with them for so many years. I know them quite well, but I wasn't asked to get in and run things per se. I was asked to perform again like the same kind of thing I've always done: an oversight consulting kind of function.

ESSIG: Okay.

DONALDSON: What, I want to clarify for you what we're trying to reach here. In other discussions it came to pass that it was not clear who was directing what should be done in terms of the collection of various

samples, who might have been running the show in certain areas. What we're trying to establish is under whose authority in the Unit 1 control room were you in fact operating and if you had requests for information, did you pursue those requests independently or were they directed through a Metropolitan Edison emergency organization individual for resolution?

PORTER: Well, as much as possible I tried to work through the emergency director there in the Unit 1 contol room. Now-- (END OF CASSETTE)

SHACKLETON: This is a continuation of the interview of Mr. Sidney W. Porter, Jr. We went off on the last tape at 9:56 a.m., April 24, 1979, and we will pick up and try and repeat the last question, or at least the response. Gentlemen, go ahead please.

PORTER: Okay. You want to repeat that last question, Dale, and then I'll try to...

DONALDSON: As best I can remember we were talking about the... your interface with the Metropolitan Edison emergency organization.

PORTER: I think my interface, in looking at the emergency organization, was advisor to the person acting in the role of the radiation protection supervisor in the ECS. And so, what I did was to assist him, 'cause he has a great load to carry during an emergency and needs help, and

so I was the advisor to him and I was trying to think 'Now what are we going to need tomorrow and the next day and the next day?'. And then I would talk to him about what we needed and get his okay to go ahead and take actions.

DONALDSON: Why don't we pick up on the chronology? We've got you in the Unit 1 Control Room at 8PM, take us on through and, uh, fill us in on the details of your perspective.

PORTER: I wish I had my transcripts of my own personal tapes here would help me think about my but--

DONALDSON: By the way, could I mention as a request that you provide us with a copy of your transcripts?

PORTER: Okay, yeah, there's no problem there at all. This was-- someone already requested this.

ESSIG: Okay. Uh, I guess in responding to that question, maybe you can try to give us your best recollection at this time and we'll recognize and maybe we can fill in some of the gaps when we get your tapes. And whatever time you give us now will sort of be given with that caveat.

PORTER: Okay, fine. If that'll help, because I'm a little tired now and so therefore it's hard to remember precisely what I did back in that first 48 hour period. Uh, there were, you know, great pressures on everybody and the emergency director and the person filling the slot of the radiation protection supervisor both needed help in carrying out all their functions and I just acted as an aid to them in carrying these functions out. Keeping in mind that, uh, when I could break free, the thing that I had to do was to get together data for assessment of the radioeffluent releases, and so I was just keeping that in mind while I was helping out. The first thing that I remember doing was to make sure that the reliefs were coming in for the teams. That was paramount in my mind, that these guys were getting very tired and that they had to have reliefs and I can remember thinking about that and saying, you know, well I've made the arrangement lets just make sure that the arrangements come to fruition, and have these other experienced people in here to help take over. The Salem people did arrive about a half hour after I did in the control room and they were dispatched almost, almost immediately after they were shown where they needed to go and given the big picture. Then it wasn't too long after that that the-- maybe, I don't know, about 10-12 hours after that that the Susquehanna people arrived... people from Susquehanna Steam Electric Station in Berwick, Pennsylvania, Pennsylvania Power and Light Company, and they were also used for direct reliefs. We used the supervisor's radiation protection chemistry for Salem/Susquehanna plants to help us with dose assessment to help to do some of the planning further down

the line here that needed to be done. One of the things that I started to do that evening was to place a call to Radiation Management Corporation and say that I wanted their whole body counter up here--oh, oh, I found out the whole body counter was on site, I wanted somebody up here to run it, and asked that it be available the next morning for counting--

ESSIG: The 29th?

PORTER: Yes, yes. That it be available on the 29th for counting because I knew there were certain key jobs going on in the Aux building. People had been in and out of the Aux building (ah, Unit 2 auxiliary building) and I had-- and I knew that there were not sufficient personnel to perform all the airborne surveys that I would have liked to have had then, and therefore I wanted to make sure that we got a few of these key people and counted them, just to make sure that we had some control on internal intakes. So I uh, that night and the next morning one of the things I did was to talk to the guards who were taking the dosimeter readings as people left the island; as people were cycled of shift and get a list of people that got more than 100 mR because I knew more than likely where they got the 100 mR was going to be cause they had gone into the Aux building. I also went over and talked to the operators from Unit 2 and said 'Hey, who's-- has anybody gotten any large exposures?' I just talked to the guys who were all lined up enough then to be coming in and out and I came up with a hit parade.

Just all I wanted was a rough list of names where I could do a spot sampling to make sure that we had the internal exposures under control. And we did count these people and we found no surprises I'm glad to say. But I didn't know at the time whether we would or wouldn't and so that's why-- that's one of the things I thought about early on doing.

DONALDSON: Now let me clarify this to make sure I understand. On that first evening, one of the things you did was make a spot check of people by name just to find out who had dosimeter exposures, pocket chamber exposure, of 100 mR or greater so that you could take a sampling and whole body count in the morning to get a handle on whether or not there were being any uptakes.

PORTER: Right, also talked to the chemist who I knew would be taking samples and wanted some chemists in there to be counted too. There were certain people that if you know the plant, you know that if any of us would be getting exposure, its going to be one of these two or three groups. So you just go to the groups.

DONALDSON: So let me ask you -- during this first night or any time shortly thereafter, were there any of RCS letdown samples taken that you know of?

PORTER: There was one sample taken in the first two days, Dale, I'm not so sure it wasn't the second day rather than the first. You've got to remember that I stayed up for a long time and the one day drifts into the other and I can't give you exact times on these things. It seems to me within the first two days there was one sample, it might have been the first three days. But in the first two, I'll put the statement, within the first three days I believe there was one sample taken.

DONALDSON: You were not involved in any of the planning or discussions involving that sample, were you?

PORTER: Uh, no, I was not really involved in that. I knew it was going to be done and then I knew it was done, and I just made sure that the chemist took the samples got whole body counted.

DONALDSON: Do you remember who that individual was?

PORTER: Ed...

DONALDSON: Houser?

PORTER: It begins with an 'H'.

DONALDSON: Houser...

PORTER: Yes, Houser, Ed Houser.

DONALDSON: Now, can you, a little bit about--

PORTER: You know, my days might be off. It might have been the fourth day. Some time in the first four days the sample was taken. That's a matter of record. You can check that.

DONALDSON: Sure. Let's just talk about this for a short period of time. This RCS letdown sample that was taken by Mr. Houser, you said you'd heard that it was going to be taken and then you heard that it had been taken. In your capacity as a consultant, were you asked in any capacity to review or discuss the operation either with Mr. Dubiel, Mr. Mulleavy, Mr. Houser, or Mr. Velez, the other individual who was involved in the taking of that sample?

PORTER: Not on the first one. On the second one I was very much involved. In the first one I was not involved... it was the Unit 2 sample sink controlled by Unit 2 and since both Dubiel and Mulleavy were over at Unit 2, that is obviously something that was under their control and I was not involved in this first one. I just knew it had been taken and that keyed me to think 'Well, I just want to whole body count this individual', because of the fact that he had been there in

the Unit 2 sample sink and I knew that there had to be fairly high degassing involved. As it turned out it was not that significant, but the thing is that I guessed that if there was anyone who was going to get an internal intake it might have been him and therefore I thought it was prudent to make sure that we whole body counted him.

DONALDSON: In your involvement in preparing the procedures and methods for the second-- I should say, let's say subsequent RCS letdown sample, did you at all discuss the sample that was taken by Mr. Houser and Mr. Velez with these two individuals and use it as input in planning for the one that you were involved in advising.

PORTER: Only say I discussed it, I'm not sure who with. In other words, I got the exposure of the fellow. I talked to him a little bit; I talked to Ed Houser briefly about himself, about the procedure and at that point I thought, well the procedure can be improved upon because he got, what, 2.8 rem or something, I think, as I remember from taking that sample, exposure, in that neighborhood. And so I thought to myself, 'Okay, this is something that needs to be thought out a little better', and so I sat down after I had found out that he had gotten an exposure. I talked to a couple of the chemists briefly about it and then I sat down with Jim Galler, who's supposed to help us in chemistry from Salem and has a very similar sample sink to the Salem one, and he'd taken a real brief look at that sample sink. And he's a very fine chemist and I said, 'Hey Jim, let's devise a way to

have several people perform this procedure' and then we-- and then Jim came up with a five-step-- five-man approach to taking this and I presented the five-man approach to Seelinger who at that point was over in Unit 2. And said, when you write the RWP for taking a second sample, it would be a good idea to spread the dose out among the number of people and here's a rough cut at what an operating procedure would be for taking sample, and so the dose would be spread out among the number of people and one person would not get a subsequent dose. And Jim just took it from there and the other involvement was that I was asked to do an assessment of what the instantaneous release would be.

DONALDSON: Let's go back again. Let's stay with this RCS letdown sample for a while--

PORTER: That's what I've been talking about the instantaneous release probably would take a second sample.

DONALDSON: You say you proposed the five-man approach in order to minimize the individual exposures. Do you know whether or not this approach was adopted?

PORTER: Yes, it was...

DONALDSON: It was. Would you expect that, knowing what you knew about the dose rates in the area and the potential for exposures, that a five-man approach or the spread out of dose to individuals as opposed to taking high individual doses on a fewer people would be preferable under those conditions?

PORTER: You've got to assess it each time individually; in other words, you have to look at where you are when you're taking the sample. I can-- I'm never smart enough to be able to second guess in an emergency condition--

DONALDSON: What factors helped you--

PORTER: You have to look at the factors each time around--

DONALDSON: Let me ask you what factors you looked at in determining that a five-man approach should be used.

PORTER: Well, we looked at the factors-- okay, what factors did we look at? Uh, the general radiation in the area, of course was the first thing we looked at, stay times. Secondly, the exposure that we're going to get as you fill the vessel up and the size of the vessel was another factor. In other words, I think they took a fairly large sample the first time, I forget how many cc's it was but they got considerable exposure just from the amount of cc's that was taken

out of there. The third factor was the minimum time that you can recirc the system because I think in... when they... let me still look... I have some of this written out, as a matter of fact, you know, I just wrote down notes and thought about this and...

DONALDSON: Now answer it again, would you be willing to provide us, let us make copies of those notes relative to that procedure?

PORTER: Those are.... NRC has them already. Because, I... there was a guy from I&E that went over my assumptions with me and actually signed the... signed off on the thing. So you already have these.

DONALDSON: The investigation team would like to have that copy.

PORTER: Let me see if I can find what we're talking about here...[SOUND OF PAPERS BEING RIFFLED] It's a bad xerox, of what I have of it, I don't have the original any longer come across it in a second. Here we go. This is a hazards analysis I did for the... taking Unit 2 primary cooling sample and... Okay. This was done on 4/10 and it was reviewed by Jack Donohew of the NRC, who's an I&E man.

ESSIG: He's NRR...

PORTER: Oh, NRR is it? NRR? Okay, so it was reviewed by Jack Donohew and what I was looking at was... what the release... for this particular

piece of paper I was looking at what would be the release rate up the stack. But, what I discussed with B&W-- there was a B&W man that actually was writing this procedure as I remember, for the sample that was taken on the 10th. It was written... the procedure was written several days earlier. And the B&W man precisely had all the steps that I had given to Jim Seelinger earlier and worked them out practically. But the things that we had to think about were (a) how far away can you be from the sample sink and still get the sample, or the other thing I thought about immediately was the old shield that had been designed from the SL-1 accident and I called Limroth and asked him to get up to Hershey Medical Center and get that shield down here because that lead glass is a good shield for the material that's in the container and also keeps the man from getting too close to the sample on a test down exposure. Now you have to trade that off against the fact that it is a little awkward to work around it and that's why practice was necessary. And they went in and they practiced this, and the, ran these practices several times. I witnessed two or three of the practice runs, as a matter of fact. As I was doing this assessment. The assessment that I actually did on paper here that I have a record of here was what's the maximum amount of activity that we're going to have go out the vent from this procedure?

DONALDSON: Alright, that was on the 10th, correct?

PORTER: Yes. That was on the 10th, but in doing this we took a look the recirc time and as you know, you have to get rid of all the water that has been sitting stagnant in the sample line first. And that's a problem because of the fact that there's water primary coolant coming out and that's going to de gas.

DONALDSON: I guess, just to wrap up this end in terms of the planning, as a certified health physicist, would you say that this kind of an operation with the dose rates that not only did exist in the sample sink area, but which could be projected to have existed during the taking of the sample and subsequent to that, that this had to be a thoroughly carefully planned operation?

PORTER: Well, I think it was prudent to have a carefully planned operation..., lets put it that way.

DONALDSON: Thank you. Now, back to your discussions with Mr. Houser after he had taken the first RCS letdown sample. Were you asked to discuss the procedure with Mr. Velez also?

PORTER: No, I was not asked to do that.

DONALDSON: Were you asked to do any type of additional dose assessment on these individuals as a result of their first operation?

PORTER: Yeah, I was asked to follow up on the whole body count of Mr. Houser.

DONALDSON: You were not asked to do any type of dose assessment followup on Mr. Velez?

PORTER: Now wait a minute, now. Mr. Velez didn't take a sample, did he?

DONALDSON: Mr. Velez was involved in the operation and did become contaminated during the operation.

PORTER: Uh, apparently the contamination came off reasonably easily because he was not one of the people several days later that had had much significant contamination. Houser did have, and so I was asked to talk to Houser a little bit and to, you know, to see that he was whole body counted, and he had some contamination that would not come off of his arm or his leg; I forget which it was now. And, apparently he was concerned about it and so I was asked to get a medical person in just to talk to him about, to put it in perspective for him and to have somebody who would talk to him and show concern for what was happening to him.

DONALDSON: Were you at any time asked to discuss the, or review the possibility of extremity exposures to either Mr. Houser or Mr. Velez?

PORTER: No, I was not asked to do the extremity exposure assessment.

DONALDSON: Okay, fine. Let's... we can leave this topic. Do you have... do you want to pick up on anything, Tom? Any questions that you...

ESSIG: Uh, yes. Coming back to the offsite survey effort once again, one of the things that we'd like to focus on is the information survey results either as a result of samples that have been collected or the radiation measurements that have been made... direct radiation surveys that have been made. We are trying to get an idea of what was available to Met Ed people during the first three days following the event--the first 72 hours following the event. Now, as far as the sample collection was concerned, the samples that you indicated were started to be collected on the 29th, do you recall what the turnaround time was on those samples when you first had results in or when results were first made available to Met Ed from which they could make use of some kind of decision making process?

PORTER: I knew they were telephoned in to me because I had asked that they be telephoned in right away both to Reading and to me in the Unit 1 control room...

ESSIG: Okay...

PORTER: ...because I wanted to try to get a handle on what was happening in the environment and this was of course of great concern both to me and to Met Ed and it was rapid and you will have to ask Steve Gertz as far as the timing was concerned. It was... the nice thing about having a man that was only concerned with that. He wasn't at the plant, he had no pressures from the plant, he was--

ESSIG: He was not at the plant at any time--

PORTER: No, no. Not at any time...

ESSIG: He had always been in Ardmore...

PORTER: Absolutely. He ran the whole thing from Ardmore. And I heartily approved of that procedure. He had no pressures from the plant whatosever and he had only one thing to think about that is to get those samples there get them properly analyzed and get the data back to us. And that is what he did. He has my staff there to help him and Ron Laughlin and the labs in other words I think it is best that he still hasn't been up on site there is no reason for him to be here. This just adds a confusing factor to things to bring him up here. It is better that he stay back there and do what he can do best under his normal environment. He operates much more efficently that way.

ESSIG: Well would you have then...maybe your response was that we should get this information from Steve Gertz.

PORTER: Right, because it is much more accurate than mine than I can give to you, is the point.

ESSIG: Right. Okay.

PORTER: I have some of my notes on the stuff that he telephoned into me as soon as it was available.

ESSIG: I just wanted to have some indication of whether we are talking about a one day turnaround time, a two day turnaround time, three day particularly on the iodines in the air, iodines in milk, TLDs say just for those three sample types. We had an awful lot of measurements during that period of time for which the turnaround was essentially instantaneous because of the direct radiation surveys the teams were making. Some of the other results which could have and should have entered into the Met Ed's decisionmaking process, the iodines in milk and air and so on.

PORTER: Well the iodines in air they were doing these and they were counting them on the SAM 2's now this worked for the 28th now for the 29th we have some technical problems and that is the xenon levels increased on the second day on the 29th. And with that what we had

was that with taking these samples we had so much xenon in the samples that we began to get a few false positive readings on the iodine in the charcoals and I suspected that they might not be correct I wanted to count them on the Ge(Li) detector in the plant and that was impossible because the xenon levels were too high and had a 100% dead time on it. So we did two things we moved the Ge(Li) detector out of the plant into the circ water pump house so that it was more usable and by the way again that was Jim Geller from Salem did that. He and his people who are very familiar with Ge(Li) detectors just did that whole project because they knew how important it was that you move it and that you don't, treat it like a pregnant woman, very carefully when you move it around, so he moved it and he did such a good job that the thing came out it didn't even need recalibrating they ran it and the peaks hadn't even shifted. It was just beautiful when it was moved out there. And so he did that and NRC, I believe it was the second day of the event, had their trailer up here. So one of the first things I did was to have some of the positives on the SAM 2's, they weren't very positive, just barely positive, and I suspected that it might be what we called white out. The crystal was just absolutely, there was much xenon there, that the crystal was saturated because there are small crystals in the SAM 2's. And so I had a couple, we got two or three positives and I immediately said it doesn't make sense that these were positive when they hadn't been up to now. So sent them over and the NRC counted them if you hadn't been there they simply would have gone another half hour to Harrisburg and I would have had Maggie Reilly count them.

DONALDSON: Syd, in discussing or evaluating the results of the offsite samples what other data point did you have that, was there a monitor somewhere on the plant effluent stream (plant vent) that you used as input in the thought process to say to yourself that this could not possibly be a true positive?

PORTER: Well, there is a monitor there but, as I think your aware, the Unit 2 monitors were in fact offscale at the time, or reading so high so close to offscale. In other words they were saturated with the xenon levels in the Aux. building is the problem. That is my assessment of the early problem with the monitors was that there was so much xenon in the buildings, so many noble gases in the building that the HPR-219 which is the final stack monitor, the HPR-228 which is after the filters in the Aux. building, the HPR-221B which is after the filters in the fuel handling building were all either offscale or so close to offscale and that they weren't moving with times when we knew that there was so venting going on. So we realized that they were not useful in assessing the release of radioiodine as such and so what had to be done was that we had to take the charcoals off and have them counted in a laboratory offsite so that is what we had to do there. I might add that all of the offsite charcoals that we counted with the good Ge(Li) showed no iodine, and boy we counted a lot of them too. I mean there were a you know, we tried to take one an hour in the downwind plume but we didn't always do that we got a helicopter to move them from the west coast (west shore) to the east shore in

order to facilitate this. That was very useful by the way the helicopter exchanged teams for us and the helicopters when the chips were down they fly in any weather because we had some lousy weather the first few days.

SHACKLETON: Gentlemen, we will have to close this tape and get ready to change to another side time is now about 10:28 we originally started this tape at 10:00 in the morning on April 24, 1979 and we will shut off for now and resume in a few minutes.

SHACKLETON: This is a continuation of the interview with Mr. Sydney W. Porter, Jr. The time is now 10:33 a.m. on the morning of April 24, 1979 and a moderator, in the event I failed to identify myself by job title, I am an investigatory for the U.S. Nuclear Regulatory Commission assigned to Region V. Gentlemen will you please continue.

ESSIG: Syd, let's come back to the point you were making prior to our switching to this tape you indicated that, as I recall, there were samples collected in the downwind direction roughly on an hourly basis during some period of time would you elaborate a little more as best your recall as to, for what period of time that statement applied? When you say hourly, was that during the 29th or during the, were there any collected on the 28th or was that statement would that be applicable for, say, the entire three day period that were of interest here? Or?

PORTER: I can't talk very intelligently about the samples that were taken before I arrived in the Unit 1 control room for the first time on the 28th except to say that there had been iodine samples taken and I asked about them and the results were all negative there had been some taken and I asked about okay what did these read and I was told that there was nothing positive on them. And the only thing that I said was well if possible I would like to take one an hour now that is not always possible, but I like to take one sample an hour in the downwind direction.

ESSIG: Okay this is what you indicated shortly after you arrived in the Unit 1 control room then and sort of got on top of things and you had talked with the people there and found out that there had been some collected and you indicated why I'd like to get one every hour in the downwind direction and do you know was that then pretty much put into effect immediately?

PORTER: Yes, well they were trying to do that in other words, that I am not sure about every houR, but they were taking fairly frequent iodine samples or charcoal samples for iodine and all I said was well I think we ought to have a protocol here so that when you all cycle off the next guy will know to ask for that sample once an hour in the prevalent downwind direction and the procedure I set up was that as the wind was shifting around which is a problem so that the procedure I set up was well you know use your survey instruments and go the

point of the highest noble gas dose and at that point take your five minute sample and then get the heck out of there so you don't exposure yourselves too much. Don't count it there just take the sample there then when you have a chance a later on count it with it your SAM 2, or if you can ship it over here and let's get it counted on the Ge(Li)..

DONALDSON: Syd when did you say the first, you received the first spot spotting positive iodine samples?

PORTER: I think it was the second day, I think it was not even to, see we had the doses were higher on the second day than the first day I remember that distinctly, that the gamma doses were higher.

DONALDSON: Now was this the morning or the afternoon.

PORTER: I can't tell you that.

DONALDSON: Okay. Now as far as the data that you had available...again trying to determine that this was in fact a jammed crystal or xenon Peaks compton's effect whatever, what parameters within in the plant or did you have available to make that decision on it that you could say that it wasn't iodine. What thought process did you go through?

PORTER: Well it is a good question. We had been taking some samples within the plant which is the same air the people were breathing

outside. And I had taken, I had several of those brought up and counted on the SAM-2 in the control room there which is another several had been taken in the turbine I think building and we had taken several turbine building samples and I forget where else there were some more taken, but several of them where brought back in and I believe one or two of the samples that were taken at the fence post were brought back in and I personally counted those with the SAM-2 which was sitting right there when I could. Now the problem is that I couldn't always count them because then the xenon background was jerking around too much. Then there's a problem with establishing a background and you have to establish a background to count.

DONALDSON: You were in the control room and you were attempting to count these in the xenon background in your control room was shifting?

PORTER: When I counted them when it wasn't shifting when it was shifting I obviously didn't count them.

DONALDSON: There was a xenon background in the control room.

PORTER: Off and on not continuously but off and on. What happened was that there was very little wind speed and the wind would shift around and the xenon would taken in the intake. Now it went through filters but of course the filters aren't going to take out all of the xenon.

DONALDSON: Wasn't the Unit 1 control room on recirculation mode during this period?

PORTER: Yeah, I guess it was as a matter of fact. But we were still getting xenon in and the xenon was varying.

DONALDSON: Did anyone address this somewhat unusual occurrence? Let me rephrase this. Did you note any alarms on the ARMs, specifically the one which monitors control room activity?

PORTER: No, because the xenon was not that high too alarm the ARMs and I followed the charcoals and the charcoals weren't going up at all so it was obviously that (a) we didn't even have enough xenon to attach to the charcoal to make the charcoal drive up, no less any halogens in there, so essentially we had pretty well halogen free atmosphere. Now we were conservative about this when the background would start to go up significantly (which happened several times), we would go on respirators until we finished our air sample and the counted the air sample to see where we were, just to make sure there were no halogens. Even so that we were on recirc, I was still apprehensive about halogens and I wanted to make sure that these people were being properly protected. And so, I am not addressing really the full impact of your question what your saying is that, are you asking how did I know that we didn't have halogens in the control room?

DONALDSON: I think the essence of the question is, when you had received reports from the offsite survey teams that they had received positive readings for iodine, a decision was made or a conclusion was reached that in fact it was not iodine?

PORTER: I wasn't reached until in other words, I asked them to go off in another place and recount them again and that took a while, and in the mean time, I got a couple back and, by the way, they were just barely positive--they weren't very positive just, you know, just above background in numbers and I didn't say I didn't believe it I said I...(how can I say?) I mistrusted the data and I wanted to verify it. In other words, I had to go with what I had but then at that the point, the NRC trailer was here and so we took these over to the NRC trailer and they counted them and they told us we had none. And then at that point, I asked for a couple up there counted them there and I did see that one of them was particularly high in mR per hour just reading it (reading the charcoals out with the survey meter), I put that on and I noticed that I was getting energy right across all the spectrum. As I moved the window across I was getting counts on all the windows which told me that 'hey I am having an instrument malfunction problem, because no matter what you are putting out your are not going to have counts everywhere'.

DONALDSON: This was a SAM 2 that was malfunctioning?

PORTER: Yes, right. No, I think the SAM 2 was functioning fine, what it was telling me is that I was putting into a more than it could resolve in what I was doing in other words so I came up with a quick and dirty procedure for the fact that hey let's move the window down to the xenon peak let's look at a xenon peak and turn the count right meter all the way up and if the count right meter pegs then this tells me that I have got too many counts in here for the crystal to handle. And we have to do one of two things, one of three things, (a) count on a jelly which is the best thing, (b) wait awhile and count it, or (c) blow a little hot air through it in a controlled manner to get rid of some of the xenon and so that you can count your, we had those three choices, but of course, the problem was that under emergency conditions there is no time to retrain people for new procedures and therefore this is something that I think maybe needs to go on the record for okay we need plan B for the use of the SAM 2's when we have very high xenons. No one had anticipated that we would have this high level of xenons. This only existed for maybe half a day (something like that) if my memory tells me and then I think we were all right. But there was half a day there when we really had high xenons.

ESSIG: Syd, could you, when we were talking about high xenons, in your opinion do you think the...you had indicated earlier that the individuals on the survey team you had asked that they collect the sample of the (or samples) at the point where the survey instrument told them where the plume was and then they were to count the sample in a lower background area with the SAM 2.

PORTER: Right, now this was not always practical because the low wind speed it turned out that the plume was really spreading out and then so therefore this was what they were to try to do but a lot of the times they couldn't do this so they were told just to properly label the sample and save it and we'd count it when we could.

ESSIG: The thrust of my question is do you have a feel (or did you have a feel at that time) for whether the xenon that was being encountered was the actual cloud in which the individual was submersed at the time he was trying to count the sample with the SAM 2 or that it was xenon actually on the charcoal which had been collected during the sampling process or a combination of the two?

PORTER: Okay, let me think about the question. The problems, in general, from what I could see, I always asked them to go out of the plume to count. And so I would imagine that the majority, not all, but the majority of the problem was from the massive amount of xenon that was on the charcoal. But I can't say there wasn't some interference because see they were doing a background and if they couldn't do their background properly then they were asked to move further away from the plume. The problem is that during the period where we had extremely little or no wind speed the plume was pretty wide and it took them awhile to get out of there.

DONALDSON: Syd, are you aware of any, or could you shed some light on any collecting media that they were using was what, the offsite teams?

PORTER: SAI 100's, in general.

DONALDSON: Which are?

PORTER: Which are charcoals that are have some iodine impregnanted with iodine on them to give them high efficiency for a HOI and organic species of iodine.

DONALDSON: Do you know of any collection media that it is selective for iodine that it is would reject retention of noble gases?

PORTER: Yeah, the problem is that you can't store it for long periods of time and so there is a problem there. Yeah, you, for 30 dollars a charcoal, you can use the SAI zeolite, silver zeolites, but with the price of silver, there will be sixty dollars a charcoal. That is an expensive way to go when you are going through so many of these, and also by the way, they don't completely reject they just take up less.

DONALDSON: would you say is a rough comparison retention?

PORTER: I can't tell you, ask Charlie Pelletier that, that is his business.

DONALDSON: I knew you would say that.

PORTER: Wouldn't you say the same thing?

ESSIG: Can we come back to one point agai? You had mentioned just a few minutes ago about the there were you sort of spoke of three ways to deal with the xenon problem. The third way that you indicated was that involved actually purging the charcoal with air.

PORTER: I am talking about with what we had at th. . moment.

ESSIG: Right. Was that third approach actually implemented at any time to your knowledge?

PORTER: I am trying to think back we discussed this and somebody said they had tried it once, but it was not implemented to my knowledge it wasn't implemented and, probably with good reason, that is, that I don't think that during the emergency, you should be performing procedures that you don't normally perform or have normally practiced ahead of time.

ESSIG: And this was not included in the normal...

PORTER: And this was a new procedure and I left it open to some of the better chemists that (you know) if they really wanted to pursue

this, it was fine, but by the time we got around to where we could perform that there were enough Ge(Li) detectors on hand so we didn't need to. I was just in the early days, on the first two days, all I was doing was I was outlining what the alternative routes were that could be taken in order to solve the problem which is what I am supposed to be doing. And it turned out that by the time we got around to where we could have (you know) done that procedure and if you use a control heat (you know) there is really not much problem with doing that you drive off little to no halogens in doing that, but you have to be careful of the temperature. And I think it needs to be done by (you know) if the technicians are going to do it, it needs to be practiced and he has to understand the limitations of what he is doing. And so by the time where we got to the point where we were going to do this there were enough Ge(li)'s on hand so that it was not necessary to do it. And the Ge(li) of course, is by far the preferable procedure to count everything.

DONALDSON: Let me back up to try to put this offsite sampling in a perspective of where it fell into the response. Now in the Unit 2 control room, monitor HPR-219 is used to project release rates and offsite consequences from a radiological standpoint. Is that correct?

PORTER: Yes, that is correct.

DONALDSON: What is the maximum range of this instrument, I believe it reads in counts per minute?

PORTER: Ten to the sixth, amega count.

DONALDSON: Okay. Do you have any idea of the vent flow rate?

PORTER: Yes, very precise idea of the vent flow rate because I went over a number of times and wrote the strip charts myself.

DONALDSON: What is that flow rate?

PORTER: It the HPR-219 itself was essentialy sampled from the top of the Unit 2 vent. And so there were three inputs to it and, roughly, the three major inputs at that time. And the first major input was the auxiliary building and that was none of the booster fans were being used, only using the final vent fan and that's roughly 42,000 cfm, added to that is the fuel handling building which is, again, roughly 42,000 cfm, and added to that which, this is air that comes in after the Aux. building and the fuel handling building are mixed, is the control building which is somewhere around 7,000 cfm. And so therefore you have somewhere in the neighborhood of 89,000 cfm leaving the vent. And this was, I looked at this, this was pretty steady for the first three to four days of the event I kept going back and looking to see if this was changing and, boy, those were nice straight lines on strip chart.

ESSIG: The flow rate was steady?

PORTER: Yes, it changed later when they started blanking off parts of the filters and doing other things, but the flow rate was quite steady during the first three to four days, I think probably longer I don't have those records with me the records are up in the effluent assessment trailer where I am working and you know your lots of people in the Commission have those records, but you can certainly look at them.

DONALDSON: Right, let's go back to talk a little more about this monitor. How the HPR-219 is significant from the standpoint that it is really the last monitor in the effluent gases path from the facility.

PORTER: That is correct.

DONALDSON: What type of channels or what type of readings are available from this monitor?

PORTER: Well, the normal three readings, there is a moving partic...no, on that one, I think there is a stationary, there is a particulate filter. Then there is a charcoal, which is for your radiohalogens, and then there is a final gas channel which monitors what has not been filtered out by the particulate filter and the charcoal filters and essentially that is a noble gas monitor, the third one.

DONALDSON: What type of charcoal cartridge is used?

PORTER: Normally, a SAI 100.

DONALDSON: Do you have a feel for the whether or not the particulate channel is an isokinetic sample?

PORTER: Yeah, they have done the best they can on that. I think it is reasonably good isokinetic sampling. You have the bends were gentle on it and they tried hard to meet the ANSI standard on that as far as the design of it is concerned, so I think it is a reasonably good isokinetic sample.

DONALDSON: Now at the time you were arrived in the control room (and generally throughout the period that we are talking about) where were the various channels, were the various readings of the channels?

PORTER: All right, now I arrived in the Unit 1 control room and you are talking about the Unit 2 HPR system right?

DONALDSON: Yes, I'm assuming that you had attempted to glean some of this data in other words do some initial assessment?

PORTER: Yes, right, well the first thing I did is just call and talk to whoever answer the phone there in the Unit 2 control room and I

said where do we stand on HPR-219, 228, and 221B. And essentially what he said was that they were all either offscale or close to being offscale and they all were on alarm, and that is the answer I was given for those.

DONALDSON: Now in looking at HPR-219, in any of your review of the licensee's emergency procedures (offsite dose calculations) had you had the opportunity to look at the significance of a full scale reading and by this in the context of this question, I am saying let's assume that it is right at $10^6$ it's not higher it is right at, do you have a feel for the corresponding site boundary dose rate for the various channels assuming worst case meteorology?

PORTER: All right, well assuming worst case meteorology and leaving the iodine channel out of the discussion for now and talking about the other two channels, there is no real problem with high exposures offsite with those other two being at $10^6$. In other words, we had gone through the numbers and practice them many, many times and it did not give very, it did not give extensive it gave nothing even close to even thinking about any kind of protective actions at all, and the one that did was the iodine channel, okay? Now the iodine channel has the problem of the fact that you need to look at the counts buildup, the counts integrated over time. The actual counts themselves have little meaning (the total counts) you have to look at the counts per minute per minute.

DONALDSON: Could you clarify what your are saying is that at some point in time you would take a count per minute, per minute and at some later time say five minutes, ten minutes, you would take an additional reading and the difference of the rate of rise...

PORTER: Let me correct you, you said count per minute, per minute but you meant to say count per minute...

DONALDSON: Right, correct.

PORTER: At time A you would take a count per minute and time B you would take a count per minute and then you would note the time in between those two and you would integrate it over time, and then you would come up with a total counts per minute, per minute, or rate of rise of count rate, is what you are lookin for. Now, since these things were when I arrived essentially if not offscale, there is no way you get a rate of rise from these, you know. At the time when I was there, we could have gone back and taken a look at that but I knew one other piece of information and that is I knew that it was reading I was told three or four hundred mR per hour within a few feet of those. Somebody had gone up and taken a real fast reading with a survey meter. And you see that fact was more important to me because what that told me was even with the three inch (two to four) inch shielding that are around these things, that is nowhere near enough to keep from simply saturating that sodium iodine crystal just looking at

these. And so we were looking at a saturated sodium iodine crystal from the xenon environment that is outside the sampler. And therefore, I knew that these things were not useful in helping me to determine the radioiodine release and that is why it was all important in order to start taking those charcoals off of there and taking them to an offsite laboratory and looking at the amount of iodine on the charcoals. Then, knowing the flow rate through this (through the charcoal) and by the way, they had very good flow meters on these things, with good DP gauges so we can correct them for the differential pressure drop. Then I went back to Charlie Pelletier, who is the technical man in SAI that is most responsible for the experiments that prove what the efficiencies were, and I found out that as a matter of fact, the efficiency for the actual species that was going out of the stack was in excess of 96%.

DONALDSON: Let me clarify now I think you hit on a very important point here. From your evaluation at the time, you determined that the reason the iodine channel was offscale was not because of the buildup of collected iodine but, again because of the effects of the abnormally high xenon concentrations, which in turn, (as you used the term before) whited out the crystal looking at the charcoal samples.

PORTER: Correct. Now as the, about a week (later and it might not have been a week later--five days later, eight days later something like that), I was still thinking about this problem what I did was to

write up an RWP, Radiation Work Permit, and ask them when the changed the charcoals to leave the charcoal out, leave the pump off, and to close the shield up again. And I was down in the control room when I did this and I took readings because what I wanted to know was, without the charcoal in there what are my readings. And it turned the levels didn't go down at all. And this proved what I was sure was the point before, but this happened after the levels had dropped, I don't know they were down a factor of ten from what they had been before.

DONALDSON: Yet the levels still remained high in that channel-off scale.

PORTER: Right, I so all I did is that (you know) I was I knew it was a massive amount of 300 mR/hour there was no way that crystal was going to operate properly as far as being able to identify iodine on the charcoal. But then a week later, I was wondering if that was still the case and so I carefully noted that and found out that they did not drop at all. Then, a week after this (roughly two weeks after the event, two to three weeks after the event), I was still worried about this and at that point I was, people were getting a fair amount of exposure and so I went in to change the charcoals myself, just to cut down on the plant peoples exposure and there was something I wanted to do I took in some aerosol trichloroethylene that is used for cleaning, you know, it is just a good industrial solvent for cleaning surfaces. And after I took the charcoal out, I wiped this thing out

with about ten rags, I sprayed it, wiped it, sprayed it, wiped it, wiped everything really deconned it to the full extent of a 20 minute air bottle as best I could because at that point, the levels were down to like 5 mR per hour when I went in and, there still was a problem. I went downstairs, looked at the strip chart, for the half hour that the pump had been off, the levels dropped from (they were up to 200 or 300,000 count per minute at that point) they dropped to 20,000 counts per minute. They might even have been up to 500,000--they were quite high. They dropped down to 20,000. The second that pump turned on it went right back up to where they before and this told me that, hey, we have significant plateout all our samples and all we are doing is just pulling it back in again and recontaminating our whole sample again. And so this is significant point, hey, how did we really measure these problems under this amount of iodine, because see the iodine was probably just slowly building up during the time that we had all this noble gases in there.

DONALDSON: What you are saying is that you were getting some plateout even though you were not picking it up and releasing it in significant amounts? And that when you restarted your pump you began to break loose some of the plated out material?

PORTER: And also we started to pull xenon in too, you know, and that started to pick up on the charcoal we had too. It is a combination of the two, it is a combination of the two. These things, this is a

difficult area and these things need a lot more thinking than I have been able to give them over the past month.

DONALDSON: I think what we will do is pursue this a little further I see where it is time for us to turn the tape.

SHACKLETON: That is correct, Dale, the time is now is 11:01 a.m. and it is April 24, 1979 and we will go off the air for the present time and change tapes.

SHACKLETON: This is a continuation of the interview of Mr. Sydney W. Porter, Jr. The time is 11:06 a.m. on April 24, 1979. Please continue

ESSIG: Syd, since we have been talking about this HPR-219, I think it is important to state for the record as far as the iodine and gas channels are concerned, what are the detectors involved? How you have indicated that we have got SAI 100 charcoal cartridge in the iodine and we are looking for the count rate, we interpret that in terms of a buildup of the count rate, count per minute per minute, if you will. The detector is a sodium iodide?

PORTER: Yes, that is a sodium iodide detector and it is placed oh within about a half an inch of the face of the where the air and enters the SAI 100 activated charcoal cartridge.

ESSIG: Is it two by two sodium iodide? Or?

PORTER: I believe that it is roughly 1½ by 1½ but the thing is we will have to look and see that is what the Unit 1 is let's see what the Unit 2 is.

ESSIG: Okay, fine.

PORTER: There is plenty of sensitivity that is not our problem.

ESSIG: Right. And the gas monitor channel,...what's the detector there?

PORTER: That is typically a beta scintillator looking at a fairly large volume on it usually two to four, some where between two and four liters of gas and that is calibrated for xenon-133.

ESSIG: Okay, and just very quickly, one other point. When we indicated the gas monitor was offscale you indicated it was $10^6$ counts per minute. The iodine monitor is that...offscale on it is--

PORTER: I was either off scale or within the upper 5% of being offscale, it was close to offscale or offscale, they're all $10^6$ counts on all three channels.

ESSIG: Okay,--fine. I just wanted to clarify that with you. We can go back to your questioning, Dale.

DONALDSON: I would like to go back now to the 219 we have during the first three days the channels all fully deflected--

PORTER: Or close to it...

DONALDSON: Or close to it such that there is some question as to whether or not they would be effective in use for projecting source terms and offsite consequences. What are some of the methods that are normally... that exist in the TMI site emergency plan to cope with such conditions, that is, a condition when in the case of Unit 2 the HPR 219 monitors are offscale or inoperable?

PORTER: Well, the thing that we're mostly worried about is halogens. We know that if there are noble gases that are being released, that we can effectively evaluate that with well calibrated survey meters as far as the dose to the environment is concerned... dose in the environment. The thing that we're apprehensive about... were apprehensive about was the fact that although significant amounts of radioiodines or radiohalogens being released. So, the standard procedure which was followed was that a periodic intervals one replaced the charcoal in the iodine channel, took the charcoal to a low background area, to a lithium drifted germanium detector in a multichannel analyzer system,

and evaluated the charcoal. Then with the knowledge of what the flow rate was through the charcoal, with the knowledge of the iodine species so you knew the efficiency for the charcoal, and with the knowledge of the flow rate out the vent, we could effectively say these are how many microcuries of radioiodine we released. In the early days we looked at both Iodine-131 and Iodine-133. Iodine-133 was roughly a 20-day half-life, 20-hour half-life; of course, in after 10 half-lives was gone, and so therefore we are now just concentrating on 131.

DONALDSON: One final question in this area. In addition to the pulling of HPR 219 charcoal samples, would you say that the offsite monitoring effort, specifically the air samples being taken in the environment, also supported continual surveillance of iodine releases?

PORTER: Oh, they definitely did! Because we were taking many, many samples offsite and still do, as a matter of fact.

ESSIG: Syd, I want to ask you a question about the offsite samples since you've hit on it and I also want to ask you a question concerning the changeout of this HPR-219 charcoal. First I'll ask the offsite question. Do you know presently where the... uh, what we're talking about, the approximately hourly collection of samples in the plume? Do you know where those sample results are? Were these data that were generated by Met Ed that were just made available to you and they went... are they part of Met Ed's records--

PORTER: Oh, no, they're part of Met Ed's records. And I .. you know, they're in two places. The majority of them in the master log is up with the sample coordinator on the Unit 2 turbine building. Oh, she must have a, you know, four inches thick of just the air iodine results alone.

DONALDSON: Could you give us her name?

PORTER: Oh, Don Hetrick is the supervisor of all the sample coordinators and they are all on extension 212, if you call 944-4041, and there are a whole series of people. There, I think there are at least six sample coordinators. None of them are being... a number of them being males, by the way. [LAUGHTER] So...I can list them, you don't need these for the records, the names, because they change anyway. They are mostly chemists, professional chemists and they are very well qualified, if anything overqualified for the job they're doing.

DONALDSON: Syd, I'd like to ask you a couple of more questions in the interest--

ESSIG: Excuse me just a second Dale, I want to come back before you get into your question. Just one, one additional a question then I'll turn it over to you. The question I want to come back to on the HPR-219 charcoal changeout. When you arrived in the control room the evening of the 28th, to your knowledge had the HPR-219 charcoal been changed out since the event?

PORTER: Ah, I asked the question and I didn't get a clear answer on it, as a matter of fact. What I did was to call up there and say 'Hey, I know you guys have a lot of problems and you don't want to think about this now but we have to.' At this second and I said, 'You know, some time in the next 8 to 16 hours I'd like that changed off, I'd like to take a look at it to see where we stand on that and I'd also like to look at HPR-228 and HPR-221B to see where it's coming from, the fuel handling building or the aux building.'

ESSIG: Okay, and was that sample then to your knowledge changed out within about that time--

PORTER: Uh--

ESSIG: --the 8 to 16 hours?

PORTER: Yeah, it was, some time in that period it was changed and--

ESSIG: Then that would put it during the day on the 29th probably. Or, even maybe early in the morning--of the 29th.

PORTER: And then it was changed out again and again and again. It came up with, there were a number of, you know, many, many samples of--

ESSIG: Okay, after that initial change out then, had you, did you recommend that it be changed out every, every--

PORTER: I had asked that--

ESSIG: --every several hours or--

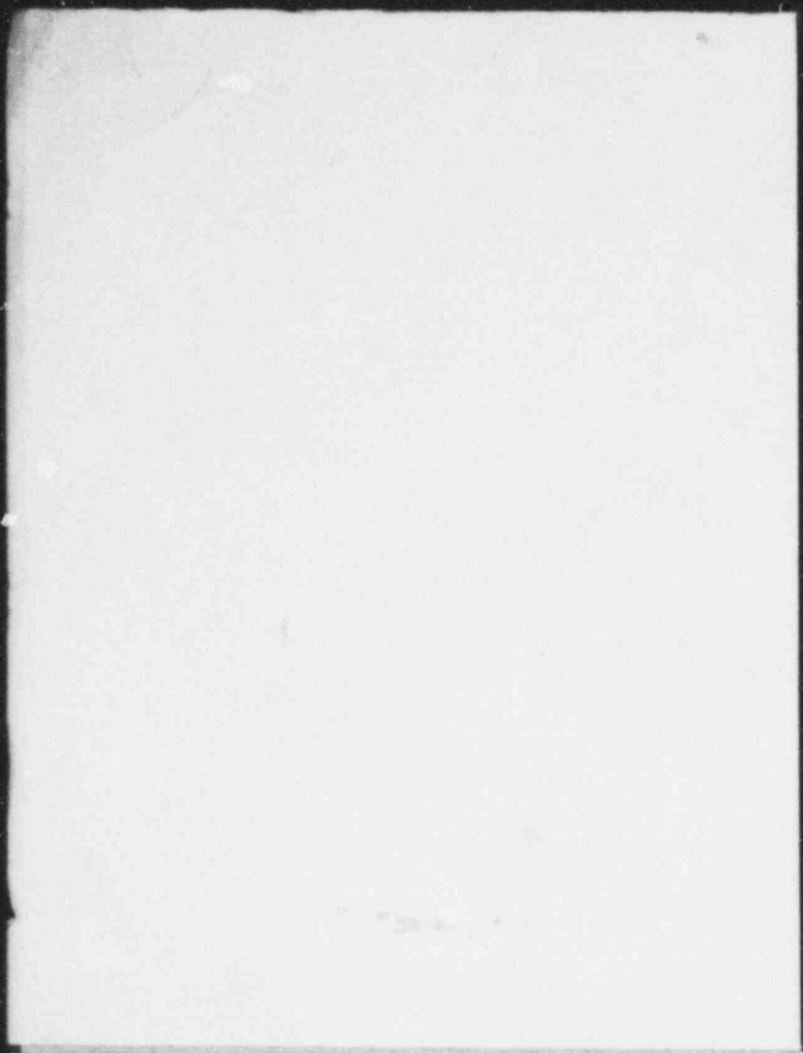
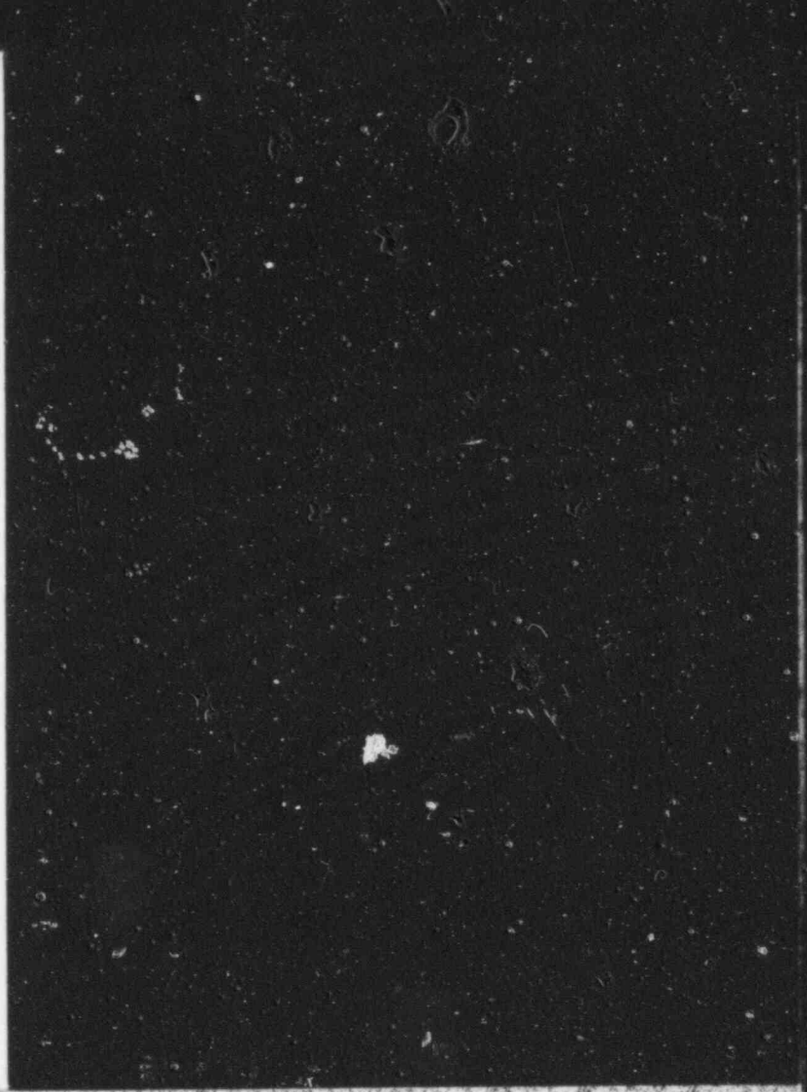
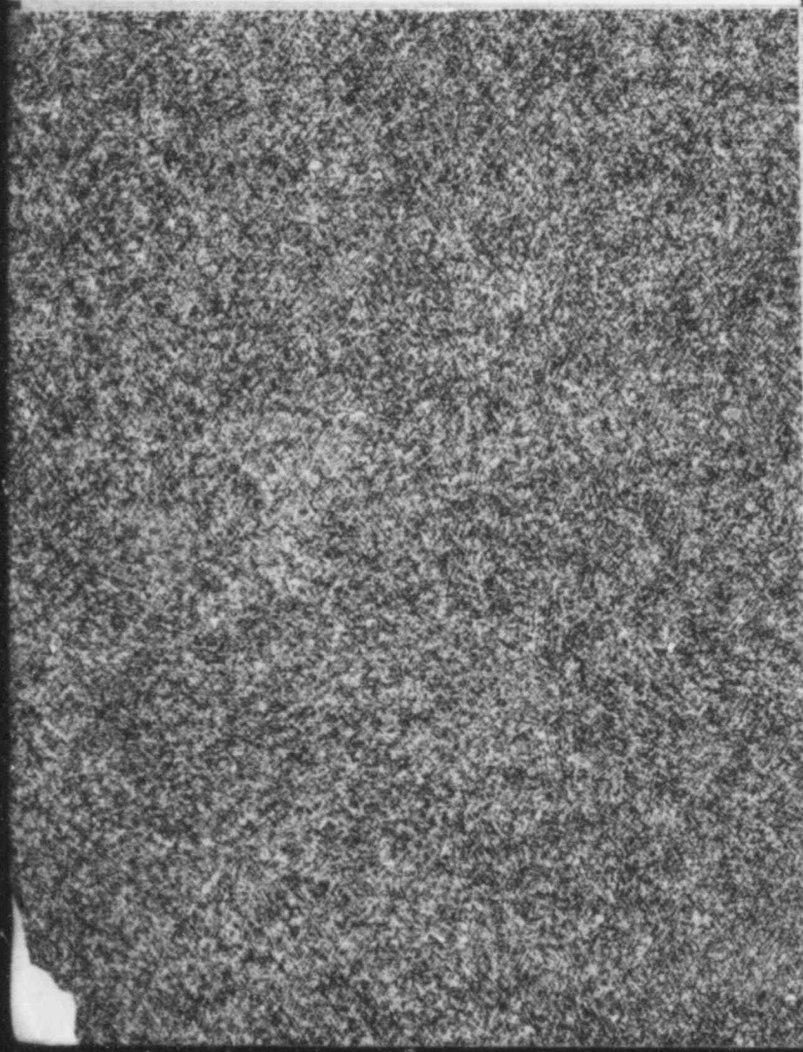
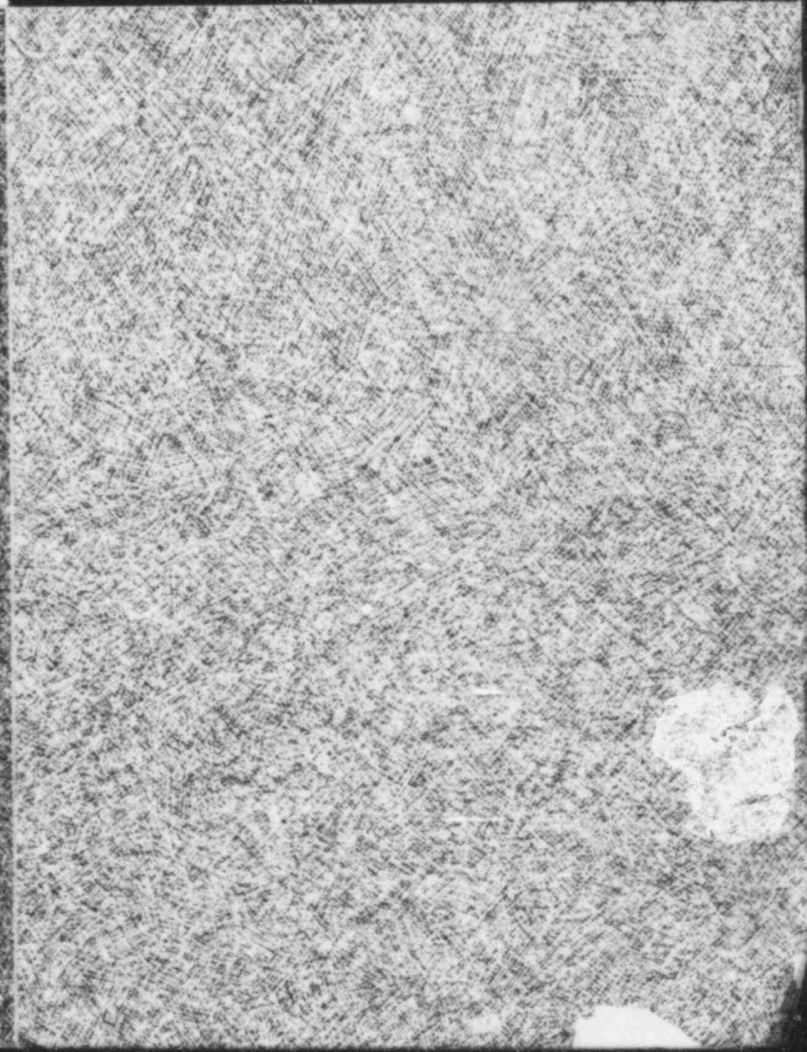
PORTER: I asked, I asked them if they could, if they could do it... in the early days I asked for once a day. Remembering that the first time they changed it out they only got 900 millirem, just to change the one thing out.

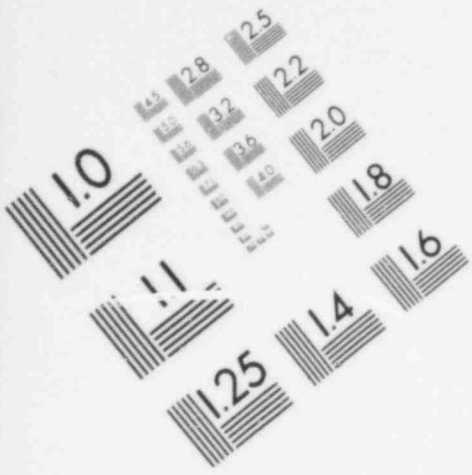
ESSIG: Right...

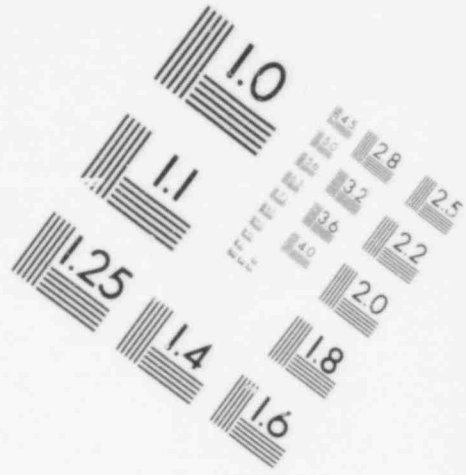
PORTER: So I was not gonna have them do it every several hours, it was an unreasonable request. --

ESSIG: Right...

PORTER: --The other thing is that it takes an hour and a half to get suited up and get ready to go in and an hour and a half to get unsuited and to get out of there. So that, you're asking, you're tying up a man for a lot of time and a lot of exposure. And therefore, I thought it was unreasonable for me to ask for one every few hours. It would have been nice to have the data, but I thought there were so many

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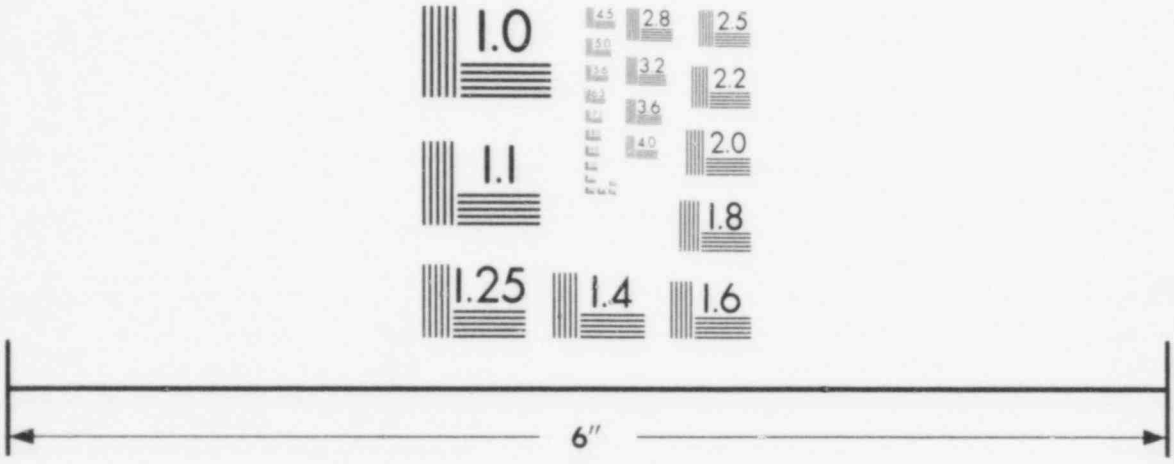



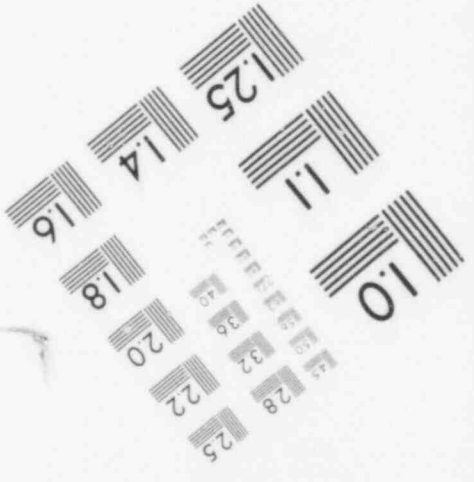

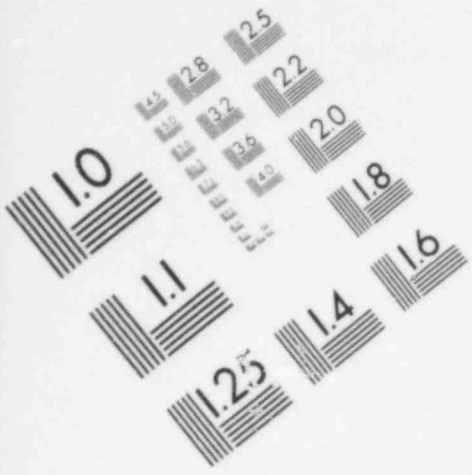


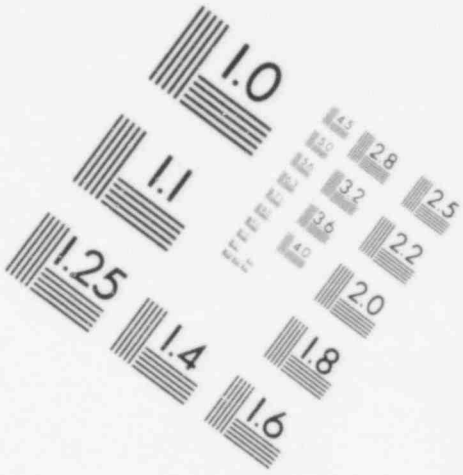


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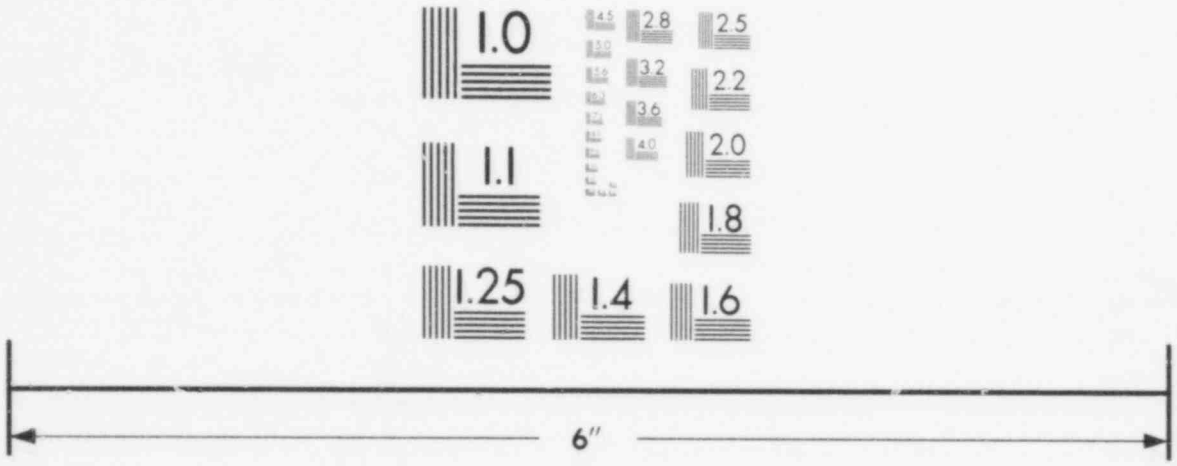


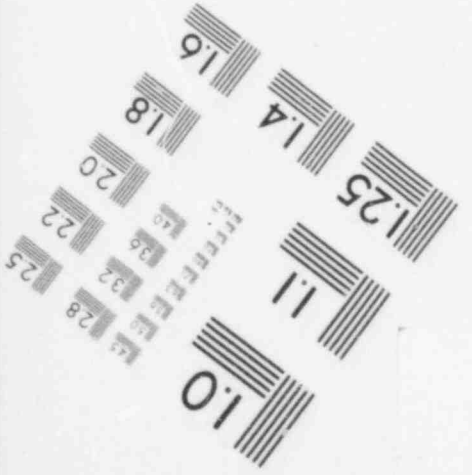


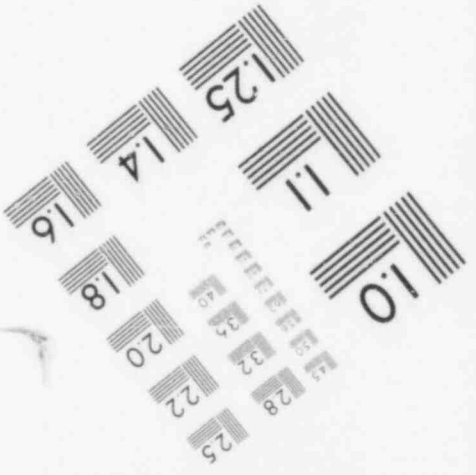

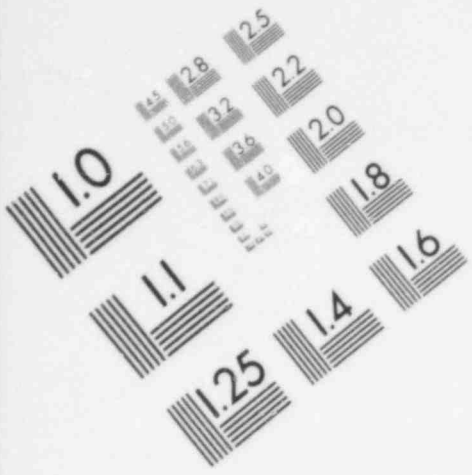


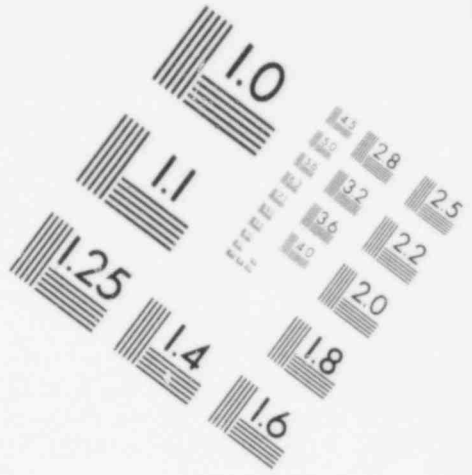


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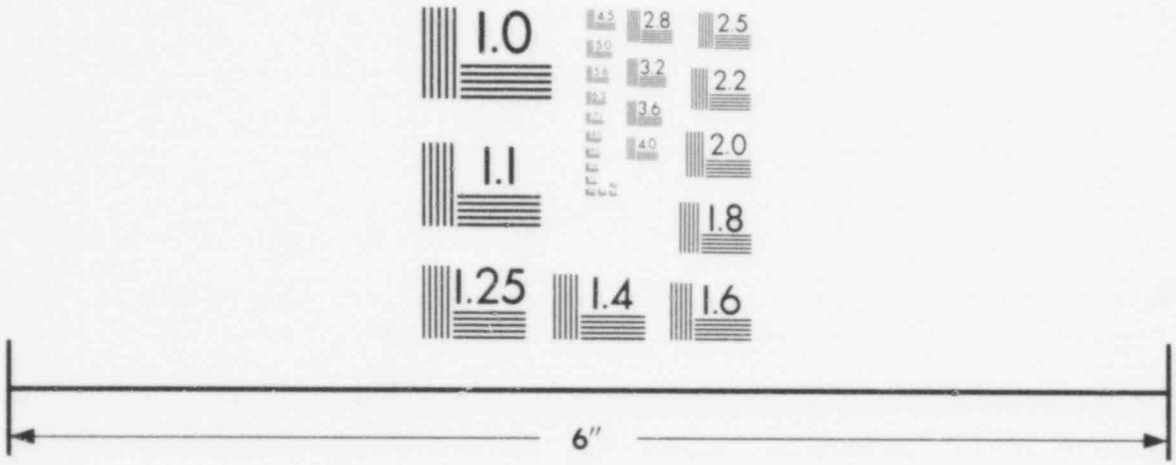


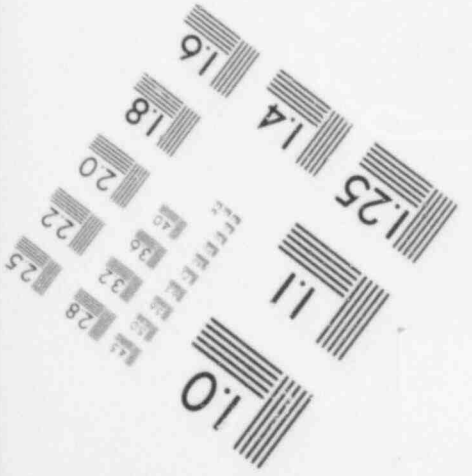


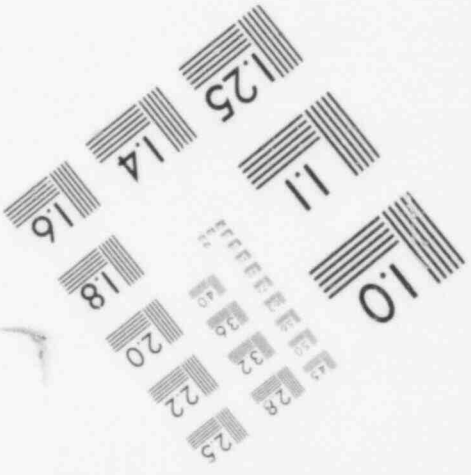

other things happening now that I wanted data and its necessary, but if it's every day and a half I'm not gonna complain. Its just that I needed some intervals where we would take it off and put another one on. The nice thing about it is that these cartridges do hold the halogens quite well and we can wait a couple of days even after we change it to count it, and we're still in good shape. There's plenty of iodine on those things, there's no problem of sensitivities what so ever. And so we had the luxury of time and therefore I wasn't going to push them too hard to take these because there were so many other things, they were responding to the accident and that was the major thing that they were doing. Getting the plant under control. And it was hard for me to get a high priority on this in the first couple of days but they understood that it had to be done and they did do it.

ESSIG: Okay, let me just ask one more question and then I'll, and I'll let Dale pick up with where he was. The sample, once the HPR-219 was initially changed out then and then changed out at some frequency, be it every day or couple of days or whatever it was, these were counted, you recall it where the first one was counted--

PORTER: No...

ESSIG: --were you set up at that time to--

PORTER: No. B&W was set up. The B&W trailer was set up and when the first one came off, it went down to be counted and the, from my understanding, went down to the Unit 1 control points in the HP lab to be counted. But there was so much xenon in the room there that they could not count and from what I can piece together, things were sent out to the B&W lab to be counted.

ESSIG: Okay, and where was the B&W lab? Was that on the island or--

PORTER: B&W... Yes it's on the island but its fairly close to the Unit 1 processing center there. Right next to the circ water pump house is precisely where it was.

ESSIG: Were you, was your Jim Geller from Salem, was he set up in the circ water pump house at that time?

PORTER: Not the first day, no. That was the second to third day we're talking about.

ESSIG: Okay.

PORTER: So therefore it couldn't be counted onsite, you know, or in the normal lab so it went out to the other lab. And that first sample I wanted to recount and cannot find it now.

ESSIG: You can't find that first sample?

PORTER: We can't find the first sample. We still probably hopefully will find it. We have a lot of samples to go through again. But what we had was, we had the backup, was the fact that everything that goes through 219 has to go through either 228 or 221B. And so I do have 22-- I have 228 and 221B to give me... the addition of those two gives me what goes up 219 if that makes sense to you...

ESSIG: Yes ..

PORTER: And so I did have data even so this was, you see we had that back up data to give so we haven't lost all the data which is what I was apprehensive about.

ESSIG: Okay. I'll turn it back over to Dale.

PORTER: Okay, what I'd like to pick up now is a line of thought that took place when with all the data that were available. And let's pick up say, the morning of the 30th of March, would be a Friday...

PORTER: You've gotta remember I had a hard time remembering what I did that morning versus that afternoon...

DONALDSON: I understand--

PORTER: --or the evening before. Alright?

DONALDSON: Now, we've got a picture of what was going on in the plant in terms of the main plant vent monitor, the HPR 219, we have a feel for what was going on in the environs in terms of sampling. Very briefly, can you just give me your analysis of what all this sampling indicated at this point in time approximately the morning of March 30.

PORTER: Well, it is of course indicated we had massive amounts of xenon which was no surprise to anyone. We knew that from survey meter readings. We didn't need the, any of the HPRs to tell us that. It also told us that we had interference with the other channels. The, in looking at the first few counts, we saw that there were small amounts, not mass amounts but small amounts of halogens being released from the plant. However, they were so small that our short term grab samples were not giving us any positive results for iodine in the environment at all. And so that's why I was very interested in environmental monitoring program. And they telephoned the results to me quite quickly, you know, as soon as they were available.

DONALDSON: Up until this point do you recall--

PORTER: These results told me, I have them right here, the first results I got. And the results told me that the iodine in milks that we took on the 29th were all less than detectable. All less than .2 picocuries per liter. 0.2 picocuries per liter. Now this--

ESSIG: These were these were phoned in from Teledyne?

PORTER: No, they were phoned in from my office. In other words, my office was doing the coordinating of...

ESSIG: Okay...

PORTER: They were phoned in from Teledyne to Reading and to my office.

ESSIG: Did you have air iodines at that point also?

PORTER: Air iodines?

ESSIG: And what did they show?

PORTER: Now, the air iodines were all... Okay, the ones offsite were all .02 picocuries per cubic meter are the units there, switching units on you.

DONALDSON: And just for discussion sake, what would be a limit in an offsite [illegible]

PORTER: In picocuries per cubic meter in an offsite area? Well, we're normally not, we normally not used to seeing anything offsite.

DONALDSON: I understand, but what is the limit to be considered if you will, a safety limit for unrestricted areas?

PORTER: Oh, in picocuries per cubic meter? Uh, well you know, a few: 1, 10, something like that, 100, something like-- Well wait a minute now, I'm not sure. Let me back off on that.

DONALDSON: Just let me, for the record, the limit for iodine in unrestricted areas is 100 picocuries per cubic meter.

PORTER: I can give it to you in dose to people and then you work back--

DONALDSON: Yeah--

PORTER: --and we'll get to it.

DONALDSON: But I wanted, we're talking in terms of the numbers that you had to look at. For example--

ESSIG: Except that that 100 is based on inhalation only.

DONALDSON: And over...

ESSIG: Right, and probably if 100 were the persist we have probably fairly significant doses being in pathway the milk pastures if the cows were in pasture at that point.

PORTER: I think that what, I think the important point was that we saw on the 29th, we picked the samples up from the afternoon of the 29th, the air iodines...That were collected. So we had the 28th and half of the 29th on them as far as the times during the event. And we saw nothing significant offsite and onsite, the 1S2, which was one of the significant down-wind stations, we saw 0.47 picocuries per cubic meter, which is extremely low. And so that we saw, from that first day and a half's worth of data, that we did not have an iodine problem, even during long term continuous sampling and that's the, I think, the important point that needs to be made. Here.

ESSIG: At what point do you recall or do you have written there, when you received, actually received these, when they were telephoned to you?

PORTER: Uh...

ESSIG: You indicated the period covered was roughly from the 28th... through about half of the 29th.

PORTER: I believe this was the, either late 30th or the 31st when I got these. In other words I got them very, very soon. Quite soon.

ESSIG: Okay.

DONALDSON: By the morning of the 30th had there been any discussions or, concerning the impact of what was going on or being released from the facility upon the general public? Projected health effects...

PORTER: Yeah, we had, Maggie Reilly had asked the question and it had been at this (Pennsylvania State DER Bureau of Radiological Health) had asked the question. Are we seeing any iodine in the environment? And the answer was we have a few false positives which we now know were not positive or, and we knew soon after they weren't. And that we see nothing in our area that are iodines and I asked her, 'Have you all seen anything in your samples?' because they were doing samples, so and the answer was 'We've seen no iodines whatsoever'. And so, and so, does that answer your question Dale? In other words we were, you know, concerned about radiohalogens and the answer was 'we've seen no significant radiohalogens in the environment whatsoever'.

DONALDSON: Let's talk a minute about any evaluation of potential hazards or doses to the population due to the noble gases. Was that discussed?

PORTER: Oh, yeah. That was certainly, that was discussed and at that point, you know, I was very interested in the TLD's and we changed, for awhile we changed TLD's out daily. And then when the level was dropped and we were getting nothing backgrounds, then we went to a 3-day regime and I think we were about to go maybe to a 7-day regime now.

DONALDSON: By the morning of the 30th, do you recall whether or not you'd had any TLD data?

PORTER: Yeah, that's the first thing we got. In other words, we changed these things on the 29th and I got a quick call on the 30th. It might not have been in the morning, it might have been the afternoon now. But I remember getting a quick call saying that 'Hey, we see nothing above, nothing very significant on these things except for the onsite ones. There is nothing offsite that was very surprising to us in the way of TLDs.'

DONALDSON: So then, by the morning of the 30th--

PORTER: We knew that there was going to be 5 or 10 millirem maybe at the most...

DONALDSON: In general--

PORTER: --but we didn't see anything that was even 1/10th of any kind of a projected level wher protective action needed to be considered.

DONALDSON: Was this discussed with the State?

PORTER: Yes, it was discussed, it was, yeah it was briefly discussed with the State. It was certainly discussed with, with Herbein who was in constant touch with the NRC, in other words, everybody was talking about this.

DONALDSON: With whom in the State and the NRC on the morning of the 30th did you discuss...

PORTER: I don't know if it was the morning of the 30th, see. You keep coming back to that time frame and I keep telling you that, hey, I can't remember what the hours were back then.

ESSIG: Would your notes clarify that?

PORTER: I don't know. Tom, I just don't know. I'm sorry, I have to be very honest with you in saying I don't know.

ESSIG: Okay.

DONALDSON: Let me get off this time of the morning then and just let's take a little different tact. At some point in time, a recommendation for action, protective actions in the environs, did or I should say was, made by the governor. Were you, did you become aware of this shortly after the announcement had been made?

PORTER: Yeah, apparently a recommendation was made...I don't know if it was on the 30th or 31st now, somewhere around in there. And a recommendation was made for protective action, and which I could not understand, because I saw no data and I in my discussion with the people in the Bureau of Radiological Health I didn't think that they saw any data to warrant taking any protective actions in the environment. Other than having the civil people on standby to take them in case the situation changed.

DONALDSON: Prior to the governor making this announcement, had... I'm assuming you were in the Unit 1 control room at this time?

PORTER: Well I don't know, which time are you talking about now?

DONALDSON: This is the morn-- when this announcement of the action was suggested.

PORTER: Yeah, I think yeah, yes I was in the Unit 1 control room for like the majority of those first three days. I was there all the ne.

DONALDSON: Had there been any discussion with the facility that you are aware of...

PORTER: With the facility...

DONALDSON: With the licensee, with anyone at the plant, regarding the intent to recommend actions to be taken on behalf of...

PORTER: We talked about, we... oh yeah, we certainly talked a number of times about 'do we need to recommend that any protective action be taken in the environment' and from the best of our knowledge I think we had all the knowledge right there, that I know of.

DONALDSON: I guess what I'm really saying is, before the State made an announcement, were you aware that it was going to be made?

PORTER: Absolutely not at all, because we kept telling the State that we had seen no data here that required any kind of protective action other than to have everyone on full alert--

DONALDSON: And up until that--

PORTER: --unless the situation changes.

DONALDSON: And up until that point in time responsible individuals in the Bureau of Radiation Health agreed with your evaluation of the data?

PORTER: As far as I know, yes.

DONALDSON: Could you, could you describe the change in mood or any discussions that ensued when it became known to the individuals in the Unit 1 control room involved in directing the emergency response, that protective actions for selected sectors of the population had been recommended?

PORTER: Well, there is a great deal of disbelief that it was really happening. I know that people said 'this really isn't true, is it?'

DONALDSON: I'd appreciate all your candor, if you would, on the impact that this had upon the operation of the emergency organization at the time.

PORTER: We... well, the impact was that, (a) I think the first one was of disbelief, why would people recommend this kind of protective

action under these technical conditions?--under these levels of radio-halogens and radio noble gases? And we could not understand why that recommendation was made. And only, and the people kept saying, 'We don't believe this is happening, he really didn't do that, did he?' And the answer was, yes, the recommendation was made, that protective action should be taken in the environment. And we kept thinking, well, this is going to be very difficult for a lot of people in the environment And we could not understand, looking at the situation, looking at the levels, why one would recommend this. And it was, how can I say, it was very... I don't know, its a little demoralizing, everyone is working as hard as he can to have as much up to date information available to all parties involved, if possible, being completely candid at this time. Nothing was held back whatsoever. The State got every piece of information they asked for and we gave, we just kept giving them all this data, keeping them up to date, doing the same thing with the NRC, keeping them completely up to date. The NRC was right there anyway. And we could not understand why this recommendation was made and I still don't understand it and, you know, I can only wonder about it but from the technical point of view, I saw no basis upon which to make that recommendation. Does that answer your question?

DONALDSON: Yes, and again in pursuing this a little further...perhaps the existing radiological conditions caused you or led you to feel that. Do you also feel that you considered the potential, either

imminent or short term potential for increased effects, was that also evaluated?

PORTER: Well, as best we could, I think, it was evaluated. And the point that was made there was that alright, things, you know, there's a certain remote possibility that things can get worse. And in order to guard against that remote possibility all the civil authorities need to be on full alert. Well they were on full alert, and they had been since the, you know, since the morning of the accident. We had monitoring teams on site and offsite and helicoptor teams around the clock. They had been there since the beginning of the accident, they were still there. We had ways of knowing, you know, that if things were getting worse we could have, there was time in order to take protective action.

DONALDSON: Would you expand on this aspect? You say if things were to get worse, that there would be time. What kind of indicators would you have had? How much time?

PORTER: Well, it depends, you know, obviously the amount of time depends on the wind speed. But the lower the wind speed the worse the consequences of any given release would be to the close in individuals which are the ones that are the highest risk. If there was a high wind speed, the plume would have been moved out quickly and the dispersion would have been very high and there probably wouldn't have been much

consequences from it. What we were worried about was the low wind speed condition where there was little or no, you know, one mile an hour or less wind kind of thing is what we were concerned about because at that point, then the depletion of the cloud would have been quite low, comparatively, and therefore there could have been fairly high exposures close in.

DONALDSON: I believe its time to turn the tape. [LAUGHTER]

SHACKLETON: Thank you Dale. It is time to turn the tape and the time is 11:33 a.m., April 24, 1979. We will return shortly.

SHACKLETON: This is a continuation of the interview of Mr. Sidney W. Porter, Jr. The time is now 11:36 a.m., April 24, 1979. Please continue.

DONALDSON: Syd, we were talking about the atmosphere and the thought process that prevailed in the Unit 1 control room at the time protective actions were recommended for selected individuals in the environs of the facility. The next question I would like to pursue is in your analysis of the potential, the actual or potential consequences from the dose standpoint, did you also in your discussions with licensee accident assessment personnel factor in the possibility of the core melt? I think this was a big question at the time. If in fact there were core melt, what would be the projected consequences? Would there

have been time to implement appropriate protective actions and so on? I'll let you just pick it up from there.

PORTER: I think that the thinking was that there is a remote but real possibility that things could get worse and I, and therefore we had to plan for that possibility. And so one of the thought processes that were going through our mind then were, 'alright, if things get worse, what's going to happen?' Well, point (1) we knew that the filtration system in both the fuel handling building and aux building were working, that essentially we were releasing no iodines and that if we had a substantially worse situation than existed with the reactor core itself, that the majority of things would be contained in containment and that there was no reason to expect that we were just going to release an incredible amount of radioiodine in a big hurry. It would be a long slow process that we would know about. And therefore, we had the luxury of some time and if things began to disintegrate we would know from the, looking at the charcoals or from the HPR-219 and from the -228 and -2218, they would start to tell us that things, that they were beginning to fill up and that were not getting the protection factors that we'd been getting before. And so then we knew that, you know, we had a reasonable, reliable to evaluate what was coming out and so if things got worse as far as the core was concerned, we still knew that we would have advance warning of what was happening. And therefore from, our thought process was, let's keep everybody on full alert, but let's not move people needlessly around the countryside,

that just creates panic. It doesn't do anyone any good. And this was the conclusion that we kept coming to every, at each point along which we reevaluated new data. And we really didn't, I don't think we came to another conclusion. We discussed this with the NRC, we discussed this with the State, and with the BRH people, and we just didn't see any other recommendation that we thought should be, you know, in good conscience made at this point, except to stay on full alert and be ready in case things were slowly beginning to get worse. Does this answer your question?

DONALDSON: Yes. Oh, one final question in this area. Do you think it was the recommendation itself or perhaps lack of communication that the recommendation was going to be made that created this change in atmosphere on the part of people in the Unit 1 control room with whom you were working?

PORTER: I'm not so sure it was such a drastic change in atmosphere. Everybody was, you know, overworked and tired. However, and it was just one more thing. Its like staying up two more hours kind of thing. It did not degrade anybody's ability to work. It was just a little bit demoralizing, that we thought a poor recommendation had been made to the environment that was going to adversely affect the entire nuclear industry. And I think it's that that ran through people's minds more than anything. It didn't, we had a job to do and I think the people that I worked with and I was associated with, I'm

very proud of what they did. There was full effort given with no selfish thoughts involved at all as far as the people were concerned and it was a demoralizing thing that happened along the way. But the whole accident was demoralizing too in a way, you know, it was a sad thing that this happened. And so, therefore, I didn't see any change in performance, I didn't see any degradation in performance whatsoever on anyone's part. It was just a demoralizing thing and we thought a poor decision had been made by political people involved and we simply went about our business as if it hadn't happened, really. And I do not agree with the suggestion that this adversely affected what we were doing. I think it might adversely affect... the poor people had to be moved out, in my opinion, needlessly but it did not adversely affect us.

DONALDSON: Tom, do you have any final technical questions that you need to wrap up or...

ESSIG: Yeah, I think there are a couple. Related back to the point you made earlier on the use of the SAM-2's zone offsite. You spoke of the... you said that we saw a few positives or apparent positives. Could you, for the record, state what the MDA, if you will, is for in terms of picocuries per cubic meter approximately? They were talking about something which is near MPC, above MPC, that is the 100 picocuries per cubic meter?

PORTER: No, we could see roughly with those things... we could see down to a half to a quarter of MPC which would be in the $10^{-9}$ region of microcuries per cc. And, with the short counting time that we have set up on there. Now you can always lengthen the counting time and lengthen the sampling time and do better than that. But I think for emergency monitoring we were not interested in a detailed low level characterization of the environment. We were looking for 'Is there a problem where we need to think about taking protective actions in the near future?' was the question that we were answering. Therefore, the $10^{-9}$ microcuries per cc for iodine-131 is thought to be a very reasonable MDA. The MDA with that instrument can be lowered by taking more time. But I thought at that point since the winds were shifting, the plume was moving around, it was important to get out and take another sample in the plume rather than low-level characterization. We had our installed offsite environmental monitoring program to give us the long term low level characterization.

ESSIG: What flow rate was involved with the actual air sampling unit, the air mover itself with these cartridges...

PORTER: I'm trying to think now. I believe it's...

DONALDSON: Sidney, you're--

PORTER: -- around 20 liters per minute, something like that?

DONALDSON: 3, 3-1/2 cubic feet, whatever that is in liters per minute... Right...It's a Radeco H809C sampler, I believe. But in any case, it was well below, I think, as I remember, I looked at 6-1/2 cubic feet a minute which is what we were averaging on the RMS system... for the mixture that was going out of the vent. I saw that we had 96% efficiency for this charcoal at 6-1/2 cubic feet a minute and I knew we were sampling well below that in the environment. Therefore, with a 96% efficiency for the 6-1/2 cubic feet per minute over a long time period, I was certainly not worried about something lower than that for a 5 or 10-minute sample.

ESSIG: Sure, okay, you've answered the thrust of my question.

PORTER: Right, but I did get it through and I did get characterizations and I did have SAI tell me what's the worse I'm going to get out of efficiency. And when they came up with a 96% that's so, you know, that's well within the other errors involved, I thought it was not worth making a 4% correction.

ESSIG: Right. Okay, just one other question. This is a followup question that Dale was pursuing earlier on the levels in the environs and what, at what point we might want to consider taking some kind of, for recommending some kind of protective action.

PORTER: Well this is up to the State. The State has very clearly defined guidelines from EPA and they have adopted the EPA guidelines and so it was just up to us to tell the State that, 'Hey, you're within 10% of your lower guideline', and which we never got to.

ESSIG: Okay. You're saying 10%, all data considered. The exposure rates offsite due to the noble gas plumes, all the iodine measurements in the area, and that type of thing.

PORTER: Correct.

ESSIG: I guess what I wanted to get to is, had you given thought at the time...we've indicated, I think, for the first couple of days that a lot of time we had very low wind speed, variable direction. Did you consider what kind of survey team results would you need to see back to tell you, 'Hey, we're getting to the point now where we ought to be flagging this to the State because we're, if this persists for say the rest of today of the rest of today and tomorrow' type thing. I just would kind or like to get a feel for what your thinking was in evaluating the survey team data that was coming back to you, because as I recall at that time there were, for example, in Goldsboro, for a good deal of one day, that was, the 29th or the 30th or, I'm a little fuzzy on dates myself. But it was like one mR/hr, fairly steadily for most of the afternoon, I think. Did you have some trigger points?

PORTER: Yeah, my trigger point is that if we're going to be giving people in the environment somewhere between 50-100 millirem, at that point we have to let the State know. It was not up to us to tell the State at that point they needed to take protective action.

ESSIG: Right.

PORTER: It was up to us to tell the State that this was the situation. But you have to remember that we were calling, that we had a hot line to the State and every, practically every number that came in we just relayed it to the State--

ESSIG: Okay...

PORTER: --so they had this information on an ongoing, continual basis.

ESSIG: Right...

PORTER: And so it was just a matter if it looked like the collective dose was up there between 50-100 mR, then it was up to me to say to the emergency director, 'At this point I think we better tell the State that it looks like the collective dose is reaching this point and so therefore, they need to think about whether or not they want to take protective action.' But we never even got to that point and that

is why it was so incredible to me that the governor took the actions that he did. I just, as a technical person, I could not understand it or fathom it. And, you know, it was a frustrating experience but the thing is that I don't think it affected anybody's ability to respond to the accident, which I think was the thrust of one of Dale's questions. Not at all. Everybody just went on about, it is demoralizing, but the point is, you have a job to do and I think they did it, everyone did it to the best of their ability.

ESSIG: Okay, one other question that comes to mind with regard to the work performed by the offsite survey teams. As best you recall, what sort of guidance was given to the survey team either by you or by other, or by Met Ed personnel in terms of what it is that we're measuring? Emphasizing, for example, that we got an 81 keV gamma that's primarily the source, the primary source of the exposure rates that we're measuring. For guidance, say, in terms of every place you make a measurement make it with the GM window open window closed, forget about window closed, do only window open, or vice versa, or was there... Was this kind of... as we sharpened the focus knowing what it was that we were encountering out there, Noble gases, specifically xenon-133 for the most part, I think initially would have some 135 in there maybe but, was there, was this sort of a feedback made to the monitoring team then, were their marching orders so to speak changed any, or what kind of guidance were they given?

PORTER: I guess they were changed a little bit because initially I think we were taking, there seemed to be an awful lot of beta dose data that was being taken. And after a couple days of this I began to think about it and to discuss it with the meterologist saying to myself, 'Well, I know what the beta gamma ratio is for xenon and therefore a gamma dose is good enough for me'. And I'm thinking to myself, 'Is there going to be any good for dose assessment later on?' This is the thought process that went through my head 'Is there going to be any good for dose assessment later on?' And I thought, "Well, maybe it will be, but let me talk to Keith Woodard, the meteorologist'. I didn't talk to him directly, I talked to Tom Potter, who works with him, who's the health physicist there.

ESSIG: Okay, now Tom Potter works for...

PORTER: Pickard and Lowe, who Keith Woodward also works for, and they were the meteorology people, the people who installed the meteorological system here on site, do the X/Q evaluations.

ESSIG: Okay...

PORTER: Uh, perform the $^{X}/_{Q}$ evaluations. And I talked to Tom about this and initially he thought that maybe that would be useful data. But then, after looking at it and thinking about it he came back and said, 'No, it's not going to be useful data'. Theoretically, it might

have been, so we did it for awhile, because theoretically he thought he could use it. But then after three or four days he came back and said 'No, really it isn't going to be that useful to him. Now the was three or four days after two or three days.

ESSIG: Right.

PORTER: Okay? So, some thought was given to it. The bottom line, you know, it's easy to sit back after a month later...

ESSIG: Sure it is...

PORTER: The bottom line is that since we had a nice consistent mix essentially, noble gases etc., we really didn't need the beta exposures. But we did take it for awhile there because there was a possibility that we might need it. As it turned out we didn't. We didn't need it. But we weren't wise enough to be able to come to that decision early in the event, is the answer to your question. So we got some, it is better to take more data if you can and then not use it than later not to have it and need it, which is my philosophy. Get the data and then later on... now we did tell the teams about iodine because this is something, had something to do with our own personal safety too, and we kept telling them, 'Hey, we find no positive iodines or nothing in the environmental program, nothing in what you were already given.' And we did keep reinforcing this, that there is no

iodine. And every once in a while I even talked with them and said 'Hey, still no iodine results, I think you should just tell the teams that there is no iodine out there, so they don't worry about themselves, needlessly. But as far as marching orders are concerned, the orders were to take the beta-gamma and then a gamma and those did change later on where we decided that the beta was not necessary.

ESSIG: Okay, now, getting back again to the assessment of actual exposure rate in terms of mR/hr, did you have any... did you feel comfortable with the fact that we were making measurements with a closed window GM tube? And given the 81 keV gamma, did you feel comfortable by interpreting that as a true exposure rate in terms of mR/hr?

PORTER: I'm going to answer that a little differently than you asked it.

ESSIG: Okay.

PORTER: I felt comfortable with the number because I'm familiar with the response of the detectors that they used here--

ESSIG: What detectors were they using, by the way?

PORTER: Oh. They were using, all E520's, they were using a number of different detectors by the way and I felt comfortable with it because all of these instruments somewhat overrespond to the 81 keV. And none of the windows were so thick that there is an abrupt cut off of efficiency of the 81 keV through the windows that they have. And the overresponse was high enough so that greater than the cutoff from the window if that makes sense to you. In other words, in some of the responses there was 150% overresponse to 81 keV. That's in that low and over-response peak it comes up if you remember the standard curve for most of these instruments is, you know, around 1 Mev is roughly 100% response.

ESSIG: Right...

PORTER: And then it might drop down a little bit and then around 100 keV comes up and then it drops sharply off. And the 81 keV is in that little peak area for most of these instruments where there is some overresponse and it going to depend on the instrument as to how much the overresponse is. The overresponse for TLD's, for instance, is quite high, 200% overresponse or so. 220% to be exact for the unshielded TLD's. But that's quite high. There's a small overresponse for most of these instruments right in that area, then it drops down. And so we, I felt that we were a little bit conservative in the numbers, in the majority of the numbers that we had. But that conservatism is, you know, pretty well well within the plus or minus calibration allowed (tolerable allowance), and considering that we were under emergency

conditions I did not think it was worthwhile jerking around correcting these numbers for corrections that were not going to be more than 10% low and might be 40% high. And so, it didn't make a lot of sense to me to make those kind of corrections. Now, I thought about it and I in fact went down, I wasn't sure about one of the instruments, I don't remember which one now, and so I went down and quick looked at a catalog and took a look at the response, the typical response characteristics in the catalog and satisfied myself and I went about my business.

ESSIG: Well, at the time, the reason I was asking the question, because early in the first several days after the event, I can't pin it down any more closer than that, but I had hauled out the Radhealth Handbook and I recall there was a response curve showing GM tubes and I think a couple of ionization chambers...

PORTER: We didn't use many GM tubes at all. The radectors were used, we used radectors. But at least in the first couple of days when I was really close to things they were using mostly ion chamber instruments. Because those were what were in the kits. Now after that, things starting getting recycled.

ESSIG: Oh, I thought you had mentioned that E530--

PORTER: E520.

ESSIG: Or E520...

PORTER: The E520 ion chamber with a sliding window opener.

ESSIG: Oh, okay, okay. I was thinking that was a GM...

PORTER: No, it isn't. And the thing is that, now there might have been some--you know other people were coming from the offsite and they might have had some GM tube instruments with them. But in general we used, you know, I happen to personally prefer ion chambers so there were no GM tube instruments in any of the kits that they initially used. Now, after 5 or 6 days there might have been a few GM tube instruments that were introduced. And I can't be exactly sure on that point without going back and asking each of the team members. I'm not a big GM tube man...

ESSIG: Okay...

PORTER: I've never been. I much prefer the ion chamber tube. But you started to make a point, I'm sorry.

ESSIG: Well. I looked at the curve in the Radhealth handbook and I had myself convinced that if we were making GM measurements, window closed GM measurements, that it appeared to me that we were, and interpreting that as mR/hr, that we were probably considerably underestimating the exposure rate because of the absorbtion of walls.

PORTER: You might if there was a 30 milligram per square centimeter window, which some similar GM tube instruments have, and you were calibrated against cobalt...

ESSIG: Yeah...

PORTER: First of all, we calibrate against cesium rather than cobalt which makes it a little better since it's a lower energy. And, secondly, at least in the initial days, I'd like to see, a lot of the guys would come in and I would just talk to the team members very briefly before they'd go out. You know. Very, very, very briefly. Just some of the team members. And I noticed the instruments. And I personally didn't see a GM tube in the first 3 days. That doesn't mean there wasn't one or two in there, but in general there were not GM tube instruments.

ESSIG: Can you elab, read, I guess I'm not familiar with the scale on the E520 but can you read by tenths of mR/hr fairly readily?

PORTER: Two-tenths I think.

ESSIG: Okay. On some ion chambers you have a, I think the ones made by Victoreen, you have a bottom scale, o. maybe 0 to 3 and so you could read...

PORTER: No. I know the instrument you're talking about--

ESSIG: ...two-tenths--

--that's not a good emergency instrument. It's too easy to punch the detector on that. So, we have to have more rugged instruments than that for emergency purposes.

ESSIG: Okay--I don't know why...

PORTER: It has to be able to survive the drop test, you know.

ESSIG: Okay. I somehow had gotten the impression that these were mostly GM measurements but from what you say it sounded like they're mostly ion chamber measurements and a few...

PORTER: I can really talk, you know, I was out, I saw the team, I talked to members of the team the first three days or so and and it's not true for the first three days. Now, someone else is going to have to answer the question after that. I can't answer it.

ESSIG: Okay, okay.

SHACKLETON: Gentlemen, we're almost running out of tape and it is 12 noon. Shall we discontinue at this point and look forward to the next session when Mr. Porter can contribute some more of his time?

DONALDSON: I really have no other questions. We will have a chance for Mr. Porter to make any general comments that he'd like.

ESSIG: I don't have any more questions right now.

SHACKLETON: You'd have a couple of minutes, I think, before we run off the reel if there's any observations or recommendations you'd like to make.

PORTER: I think it's obvious that for a generic item that we have to take a close look at the instruments that we use for the emergency monitoring team, especially for the iodine instruments. Take a closer look at that. I think that we certainly have a problem, a generic problem that has to be discussed as far as the entire design of the iodine monitor instruments. It's the weakest of all of the inplant installed monitors anyway to begin with. And now, you know, it just has to be looked at hard, I think. It s one of the things that hopefully this incident will point out the fact that we really got to do some design work in that one area. I was and still am very impressed with the staff, the Three Mile Island staff, and how they pitched together to do a job here. It was an incredible job they've done. I've never read this anywhere in any of the papers and that's alarming to me that no one realizes what they did on site. It's too bad when you think about the effort that they did put forth. That's the general comment I would like to make here. I'm very tired guys...

SHACKLETON: Right. On behalf of the Commission we thank you very much for giving us almost three hours of your time after working after 1:00 this morning. I'm closing this tape now at 12:03 p.m., April 24, 1979.